5.0 REGULATORY IMPACT REVIEW

5.1 Introduction

This Regulatory Impact Review (RIR) examines the benefits and costs of alternatives to the process by which the North Pacific Fishery Management Council (NPFMC) specifies the annual allowable biological catches (ABCs) overfishing limits (OFLs), total allowable catches (TACs), and prohibited species caps (PSCs) for the groundfish fisheries in the Gulf of Alaska (GOA) and the Bering Sea and Aleutian Islands (BSAI). This review addresses the requirements of Presidential Executive Order 12866.

5.2 What is a Regulatory Impact Review?

This Regulatory Impact Review (RIR) is responsive to Presidential Executive Order (E.O.) 12866 (58 *FR* 51735, October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

E.O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant". A "significant regulatory action" is one that is likely to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

5.3 Statutory authority

The National Marine Fisheries Service manages the U.S. groundfish fisheries of the Gulf of Alaska (GOA) and the Bering Sea/Aleutian Islands (BSAI) management areas in the Exclusive Economic Zone under the Fishery Management Plans (FMPs) for these areas. The North Pacific Fishery Management Council prepared the FMPs under the authority of the Magnuson-Stevens Fishery Conservation and Management

Act. Regulations implement the FMPs at §50 CFR part 679. General regulations that also pertain to U.S. fisheries appear at subpart H of §50 CFR part 600.

5.4 Purpose and need for action

See Section 1.0 of this analysis for a discussion of the purpose and need for this action. In summary, each year proposed groundfish harvest specifications for the Bering Sea and Aleutian Islands area (BSAI) and Gulf of Alaska (GOA) are published in the Federal Register in December. These proposed specifications, recommended for the following year by the North Pacific Fishery Management Council (Council) at its October meeting, list total allowable catch (TAC), acceptable biological catch (ABC), overfishing level (OFL), and prohibited species catch (PSC) limits, and apportionments thereof, based upon specifications effective for the current fishing year. Final specifications based on public comment on the proposed specifications and information made available at the December Council meeting are published in the Federal Register during February or early March. So that fishing may begin January 1, interim regulations are published in the Federal Register in December that authorize the release of one-fourth of each proposed TAC and apportionment thereof, one-fourth of each PSC and apportionment thereof and the first seasonal allowance of pollock and Atka mackerel. These interim specifications are superceded by the final specifications.

The existing harvest specification process is problematic for several reasons. The public is notified and given the opportunity to comment on proposed specifications that often are outdated by the time they are published. The publication of proposed specifications each year can confuse the public, because incomplete and outdated information is provided due to the need to adhere to a strict time line in order to comply with all relevant regulations. Because the interim specifications are based on the proposed specifications, they do not take into account the recommendations contained in the Groundfish Plan Teams' final SAFE documents or the recommendations coming from public testimony, the Science and Statistical Committee, the Advisory Panel, and the Council (at its December meeting). One fourth of the initial TAC and PSC amounts have been found to be an inadequate amount for those fisheries that attract the greatest amount of effort at the beginning of the fishing year. Under the current process, administrative inefficiency exists in taking the regulatory actions necessary to set interim, proposed and final specifications. For these reasons, NMFS seeks to revise the harvest specification process.

The objectives of the proposed action are: (1) to manage fisheries based on best scientific information available, (2) to provide for adequate prior public review and comment to the Secretary on Council recommendations, (3) to provide for additional opportunity for Secretarial review, (4) to minimize unnecessary disruption to fisheries and public confusion, and (5) to promote administrative efficiency.

Market failure rationale

U.S. Office of Management and Budget guidelines for analyses under E.O. 12866 state that

> …in order to establish the need for the proposed action, the analysis should discuss whether the problem constitutes a significant market failure. If the problem does not constitute a market failure, the analysis should provide an alternative demonstration of compelling public need, such as improving governmental processes or addressing

distributional concerns. If the proposed action is a result of a statutory or judicial directive, that should be so stated.[15]

The Secretary determines the ABCs, OFLs, and TACs in the groundfish fisheries in the GOA and the BSAI in response to the statutory mandates of the Magnuson-Stevens Act (MSA). The requirements of the MSA in turn represent a management response to the open access and common property rights that prevail in the GOA and BSAI groundfish fisheries. This action does not, however, address a common property problem per se; it does improve government processes.

5.5 The Four Alternatives

Four alternatives (and associated options) were discussed in detail in Section 2.1. While the reader should refer to that section for detailed descriptions of the alternatives, summaries of the alternatives and options are presented here. To make the discussion more concrete, the summaries presented here are described in terms of their hypothetical impact on the 2004 specifications (assuming the alternatives were in place - that is, the hypothetical dates in this description of the alternatives do not reflect the transitional process by which the Council would move from the status quo to one of these alternatives).

Alternative 1: the Status Quo

Under the status quo alternative, proposed and interim specifications would be published in November or December 2003. The proposed specifications would be based on the actual harvest specifications in 2003. The interim specifications would be equal to one/fourth of the actual specifications in 2003. Note that the interim specifications at the start of the fishing year are based on survey data that are 16 months old (in this instance 2003 interim specifications will be based on survey data from August 2001). The final specifications that replace the interim specifications will be based on data about 6 months old (from August 2002).

The final specifications would be based on updated information compared to the proposed specifications. The annual biological surveys for 2003 would be completed in August 2003. These data would be supplied by the Resource Assessment and Conservation Engineering (RACE) Division to the Resource Ecology and Fisheries Management (REFM) division, analyzed by assessment authors, and reviewed by the plan teams. The plan teams would finalize the SAFE documents by late November 2003. These would be used by the Council in its early December meeting as the raw material from which it would construct its own 2004 harvest specifications. Following Council approval, the final rule would be prepared by NMFS, and published in February or March 2004, supplanting the interim regulations.

Alternative 2

[15]Memorandum from Jacob Lew, OMB director, March 22, 2000. " Guidelines to Standardize Measures of Costs and Benefits and the Format of Accounting Statements," Section 1.

Under this alternative, the Council would recommend its proposed harvest specifications for 2004 in February, 2003. (Note that this is long before the summer 2003 harvest survey information becomes available. The last survey data used in this instance would be the survey data from summer 2002. The SAFE reports based on this data would become available in January 2003 and would be the input into the Council's February decision.) The Council would make its final decision on the specifications in April 2003.

Following the Council's final decision, NMFS would publish its proposed regulations in June or July 2003. After a public comment period, NMFS would publish final harvest specifications by December 1, 2003. December 1, 2003 is the last date on which the regulations could be published if they are to become effective on January 1, 2004, since a 30 day delayed effective period is required before a published final rule becomes effective under the APA.

Alternative 2 has one option. This option would require determination of the GOA and AI target species TACs biennially. Currently, resource surveys in the GOA and AI are done biennially. Under this option, the stock assessment and rulemaking process for the biennially surveyed species would be done every other year and the ABC recommendations and stock specifications would be established for two years at a time. The GOA summer trawl surveys were last conducted in the summer of 2001, while the AI summer trawl surveys were last conducted in the summer of 2002. Under this option, the AI summer survey in 2002 would be used as the basis for a SAFE report in January 2003 and would serve as the basis for specifications for 2004 and 2005. The GOA summer survey in 2003 would be used as the basis for specifications in 2005 and 2006. Then the next AI survey, in the summer of 2004, would be used for specifications in 2006 and 2007.

Alternative 3

Under Alternative 3, the assessment authors, the plan teams, the SSC, AP and Council, would develop specifications under the Alternative 1 schedule. RACE would provide survey data in September or October, 2003, the assessment authors would report to the Council's plan teams in November, 2003, and the SSC, AP and Council would meet in early December, 2003. The Council would make its specifications recommendations in December, 2003. NMFS would then begin preparation of proposed specifications for publication in January or February, 2004. Final regulations would be published in May or June, 2004. The new fishing year would begin on July 1, 2004.

This would differ from Alternative 1 in several ways. Most notably, the fishing year would begin on July 1 instead of January 1. There would be no interim specifications. The proposed specifications would be published in January or February, 2004, instead of October 2003.

Alternative 3 has one option to set sablefish TAC on a January through December schedule. This option would allow the sablefish IFQ program to be managed concurrently with the halibut IFQ program. A second option would move the December Council meeting to January to provide stock assessment scientists additional time to analyze data and produce reports.

Alternative 4

Under this alternative, the annual survey data would be compiled in the summer of 2002. The plan teams would receive it in September 2002 and begin to prepare the SAFE documents. Preliminary SAFE documents would become available to the Council in January 2003, and the Council would prepare proposed harvest specifications for 2004 and 2005 in February 2003. Final SAFE documents would be prepared for the April meeting and the Council would produce its final specifications for 2004 and 2005 at that meeting. NMFS would then publish the proposed specifications in June or July 2003 and publish a final rule no later than December 1, 2003. The proposed specifications would take effect on January 1, 2004.

These proposed specifications would be in effect for 2004 and 2005. There would be no specifications setting process in 2004. However, during 2005 a specifications process would produce rules for the period 2006 and 2007.

Alternative 4 has two options: (1) set prohibited species catch (PSC) limits annually; (2) set PSC limits every two years based on regulations and for crab and herring use either projected values or rollovers from the previous year.

Options A and B[16]

Under Option A, NMFS would no longer set aside nonspecified TAC reserves in the BSAI and would no longer set aside TAC for GOA reserves. CDQ reserves would be established as a set allocation of the total TAC. This option is independent of the four alternatives or their options, and may be adopted or not adopted with any of them.

Option B would update language in certain sections of the BSAI and GOA FMPs to remove references to foreign fishing and to allocation to foreign fishing, and to update the description of the harvest specification process for the Plan Teams regarding PSC limits apportionments, and allocations. This option will remove obsolete references to foreign fishing in the Introduction, Goals and Objectives, Stock and Area Description, and Management Measures sections of the FMPs. This option is a housekeeping option and is independent of the four alternatives or their options, and may be adopted or not adopted with any of them.

5.6 Description of the groundfish fishery

As noted earlier in the EA, detailed descriptions of the social and economic backgrounds of the groundfish fisheries may be found in the following reports:

Alaska Groundfish Fisheries. Draft Programmatic Supplemental Environmental Impact Statement (NMFS, 2001a). This report contains detailed fishery descriptions and statistics in Section 3.10,

[16]Options A and B may be applied to any of the four alternatives. These are not the options referred to as Options 1 and 2 to Alternatives 3 and 4.

"Social and Economic Conditions," and in Appendix I, "Sector and Regional Profiles of the North Pacific Groundfish Fisheries."

"Economic Status of the Groundfish Fisheries off Alaska, 2000" (Hiatt, Felthoven and Terry, 2001), also known as the "2001 Economic SAFE Report." This document is produced by NMFS and updated annually. The 2001 edition contains 49 historical tables summarizing a wide range of fishery information through the year 2000.

Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement (NMFS, 2001b. Referred to as "DSEIS" in the remainder of this section) contains several sections with useful background information on the groundfish fishery (although the majority of information provided is focused on three important species - pollock, Pacific cod, and Atka mackerel). Section 3.12.2 provides extensive background information on existing social institutions, patterns, and conditions in these fisheries and associated communities, Appendix C provides extensive information on fishery economics, and Appendix D provides extensive background information on groundfish markets.

Final Environmental Impact Statement for American Fisheries Act Amendments 61/61/13/8 (NMFS 2002) provides a survey of the Bering Sea and Aleutian Islands groundfish fishery paying particular attention to the pollock fishery and the management changes introduced into it following the American Fisheries Act. The information is contained in Section 3.3, "Features of the human environment."

General significance of the groundfish fisheries off of Alaska

In 2000, the most recent year covered by the Groundfish Economic SAFE report, the fishing fleets off Alaska produced an estimated $564.9 million in ex-vessel gross revenues from the groundfish resources of the Bering Sea and Gulf of Alaska. In 2000, groundfish accounted for just over half of the $1,098.5 billion in ex-vessel gross revenues generated off of the Alaska by all fisheries. (Hiatt, *et al.* , 2001, Table 2).

The two most economically important groundfish species were pollock and Pacific cod. Pollock catches generated estimated ex-vessel revenues of $255.8 million and accounted for 45.3 percent of all ex-vessel revenues.[17] Pacific cod was the next most significant groundfish species, measured by the size of gross revenues. Pacific cod generated an estimated $162.8 million in ex-vessel gross revenues and accounted for about 28.8% of all groundfish gross revenues. (Hiatt, *et al.* , 2001, Table 21.

Other groundfish species were economically important as well. These included sablefish ($80.4 million in estimated ex-vessel gross revenues), flatfishes (as a group of species generated $43 million in estimated ex-vessel gross revenues), rockfishes (as a group generated $$9.9 million), and Atka mackerel generating $9.4 million. (Hiatt, *et al.* , 2001, Table 21.

[17]As noted below, a large proportion of pollock is taken by catcher processors and ex-vessel prices are not generated. Ex-vessel prices have been inferred for these operations.

At the first wholesale level, the gross revenue generated by the groundfish fisheries off of Alaska were estimated to be in excess of $1.36 billion. Over half of this, $686.6 million, came from catcher/processors and motherships operating in the Bering Sea and Aleutian Islands (BSAI). Another $399.4 million was generated by shoreside processors operating in the BSAI. In the Gulf of Alaska (GOA) $41.6 million was generated by catcher/processors and $199.1 million was generated by shoreside processors. (NMFS 2001, Table 23).

Information on net returns is scanty since there is little information available on costs. A rough estimate can be made for the BSAI pollock fishery, an important part of the overall fishery. The Alaska Department of Commerce and Economic Development (ADCED) reports that in 2000 the average royalty paid, per metric ton of pollock quota, by commercial operators to CDQ groups was $292.34 (ADCED, page 27). The first wholesale value of retained pollock harvests in the BSAI was about $806 per metric ton in 2000 (Hiatt, pers. comm.). This suggests that royalty payments to CDQ groups were about 36% of the first wholesale price of a metric ton of pollock in the Bering Sea in 2000.

Extrapolating this percent to the gross first wholesale value of the BSAI pollock harvest in 2000, (i.e., $798.1 million dollars [Hiatt, *et al.,* 2001, Table 36]), suggests that resource quasi-rents from the pollock fishery might have totaled about $290 million in 2000. This would be a high estimate of the social value of the pollock fishery that year; an estimate of the true social return would have to make deductions for (a) uncompensated government support expenditures, (b) the excess burden of the taxes supporting the government expenditures; (c) potential depreciation of ecosystem capital (if any); (d) potential threats to endangered species; and (e) income accruing to residents of other countries.

Extrapolation of the royalty percentage to other segments of the groundfish fleet is almost certainly inappropriate. The BSAI pollock fishery operates under the CDQ and AFA programs and is almost certainly more efficient than the other fleet segments. Further, the measure of returns estimated above corresponds roughly to the economists' measure of "producers surplus." This will exceed the actual profits of fishing operations by their annual fixed costs.

Catcher/Processors

Catcher/processors carry the equipment and personnel they need to process the fish that they themselves catch. In some cases catcher/processors will also process fish harvested for them by catcher vessels and transferred to them at sea. There are many types of catcher/processors operating in the BSAI and GOA groundfish fisheries. They are distinguished by target species, gear, products, and vessel size.

Pollock catcher/processors in the BSAI. These vessels (which use trawl gear) are referred to as the "AFA catcher/processors" because of the role played by the American Fisheries Act (AFA) of 1998 in structuring the fishing sector. The AFA: (1) recognized pollock trawl catcher/processors as a distinct industry segment, (2) limited access to the fleet, (3) modified the historical allocation of the overall pollock TAC that the fleet had received, and (4) created a legal structure that facilitated the

formation of a catcher/processor cooperative.[18] The pollock at-sea processing fleet has two fairly distinct components - the fillet fleet, which concentrates on fillet product, and the surimi fleet, which produces a combination of surimi products and fillets. Both of these sectors also produce pollock roe, mince, and to varying degrees fish meal.

Trawl Head And Gut (H&G) catcher/processors. These factory trawlers do not process more than incidental amount of fillets. Generally they are limited to headed and gutted products or kirimi. In general, they focus their efforts on flatfish, Pacific cod, and Atka mackerel. Trawl H&G catcher/processors are generally smaller than AFA catcher/processors and operate for longer periods than the surimi and fillet catcher/processor vessels that focus on pollock. A fishing rotation in this sector might include Atka mackerel and pollock for roe in January; rock sole in February; rock sole, Pacific cod, and flatfish in March; rex sole in April; yellowfin sole and turbot in May; yellowfin sole in June; rockfish in July; and yellowfin sole and some Atka mackerel from August to December. The target fisheries of this sector are usually limited by bycatch regulations or by market constraints and only rarely are able to catch the entire TAC of the target fisheries available to them.

Pot catcher/processors. These vessels have been used primarily in the crab fisheries of the North Pacific, but increasingly are participating in the Pacific cod fisheries. They generally use pot gear, but may also use longline gear. They produce whole or headed and gutted groundfish products, some of which may be frozen in brine rather than blast frozen. Vessels in the pot catcher/processor sector predominantly use pot gear to harvest Bering Sea and GOA groundfish resources. The crab fisheries in the Bering Sea are the primary fisheries for vessels in the sector. Groundfish harvest and production are typically secondary activities. Vessels average about 135 feet LOA and are equipped with deck cranes for moving crab pots. Most pot vessel owners use their pot gear for harvesting groundfish. However, some owners change gear and participate in longline fisheries.

Longline catcher/processor. These vessels, also known as freezer longliners, use longline gear to harvest groundfish. Most longline catcher/processors are limited to headed and gutted products, and in general are smaller than trawl H&G catcher/processors. The longline catcher/processor sector evolved because regulations applying to this gear type provide more fishing days than are available to other gear types. Longline catcher/processor vessels are able to produce relatively high-value products that compensate for the relatively low catch volumes associated with longline gear. These vessels average just over 130 feet LOA. In 1999, there were 40 vessels operating in this sector. These vessels target Pacific cod, with sablefish and certain species of flatfish (especially Greenland turbot) as important secondary target species. Many vessels reported harvesting all four groundfish species groups each year from 1991 through 1999. Most harvesting activity has occurred in the Bering Sea, but longline catcher/processor vessels operate both the BSAI and GOA.

[18] There are non-pollock factory trawlers in the BSAI, about 25 'head and gut', or H&G factory trawlers, which target species other than pollock. Those vessels are not covered in this description.

Motherships

Motherships are defined as vessels that process, but do not harvest, fish. The three motherships currently eligible to participate in the BSAI pollock fishery range in length from 305 feet to 688 feet LOA.

Motherships contract with a fleet of catcher vessels that deliver raw fish to them. As of June 2000, 20 catcher vessels were permitted to make BSAI pollock deliveries to these motherships. Substantial harvesting and processing power exists in this sector, but is not as great as either the inshore or catcher/processor sectors.

Motherships are dependent on BSAI pollock for most of their income, though small amounts of income are also derived from the Pacific cod and flatfish fisheries in Alaska. In 1999, over 99 percent of the total groundfish delivered to motherships was pollock. About $30 million worth of surimi, $6 million of roe, and $3 million of meal and other products was produced from that fish. These figures exclude any additional income generated from the whiting fishery off the Oregon and Washington coasts in the summer. In 1996, whiting accounted for about 12 percent of the mothership's total revenue. Only one of the three motherships participated in the GOA during 1999, and GOA participation in previous years was also spotty. This is likely due to the Inshore/Offshore restriction that prohibits pollock from being delivered to at-sea processors in the GOA.

Catcher vessels

Catcher vessels harvest fish, but are not themselves equipped to process it. They will deliver their product at sea to a mothership or catcher/processor, or to an inshore processor. There are a wide variety of catcher vessels, distinguished by target species, delivery mode (i.e., at sea or inshore) and gear type.

AFA-qualified trawl catcher vessels Vessels harvesting BSAI pollock deliver their catch to shore plants in western Alaska, large floating (mothership) processors, and to the offshore catcher/processor fleet. Referred to as catcher vessels, these vessels comprise a relatively homogenous group, most of which are long-time, consistent participants in a variety of BSAI fisheries, including pollock, Pacific cod, and crab, as well as GOA fisheries for pollock and cod. There are 107 eligible trawl vessels in this sector, and they range from under 60 feet to 193 feet, though most of the vessels fishing BSAI pollock are from 70-130 feet. The AFA established, through minimum recent landings criteria, the list of trawl catcher vessels eligible to participate in the BSAI pollock fisheries. There is significant, and recently increasing, ownership of this fleet (about a third) by onshore processing plants.

Non-AFA trawl catcher vessel (greater than or equal to 60 feet in length) Includes all catcher vessels greater than or equal to 60 feet LOA that used trawl gear for the majority of their catch but are not qualified to fish for pollock under the AFA. They are ineligible to participate in Alaska commercial salmon fisheries with seine gear because they are longer than 58 feet. The value of 5 tons of Pacific cod at $0.20 per pound is about $2,200. Non-AFA trawl catcher vessels greater than or equal to

60 feet also tend to concentrate their efforts on groundfish, obtaining more than 80 percent of ex-vessel value from groundfish harvests. Harvests of pollock by these vessels are substantially lower than those of the AFA qualified vessels, because they have not participated in the BSAI fisheries in recent years.

Pot catcher vessel These vessels are greater than or equal to 60 feet LOA and rely on pot gear for participation in both crab and groundfish fisheries. All vessels included in the class are qualified to participate in the crab fisheries under the Crab LLP. Some of these vessels use longline gear in groundfish fisheries. Pot catcher vessels traditionally have focused on crab fisheries, but have recently adopted pot fishing techniques for use in the Pacific cod fishery, which provide a secondary source of income between crab fishing seasons. Historically, the pot fishery in Alaska waters produced crab. Several factors, including diminished king and tanner crab stocks, led crabbers to begin to harvest Pacific cod with pots in the 1990s. The feasibility of fishing Pacific cod with pots was also greatly enhanced with the implementation of Amendment 24 to the BSAI FMP, which allocated the target fishery between trawl and fixed gear vessels.

Longline catcher vessel Vessels greater than 60 feet LOA that use primarily longline gear. None of these vessels are qualified for the BSAI Crab LLP. A large majority of the longliner catcher vessels in this class operate solely with longline fixed gear, focusing on halibut and relatively high-value groundfish such as sablefish and rockfish. Both fisheries generate high value per ton, and these vessels often enter other high-value fisheries such as the albacore fisheries on the high seas. The reliance of these vessels on groundfish fisheries sets them apart from smaller fixed gear catcher vessels permitted to operate in Alaska salmon fisheries with multiple gear types. Overall, this fleet is quite diverse. Most vessels are between 60 and 80 feet long with an average length of about 70 feet. The larger vessels in this class can operate in the Bering Sea during most weather conditions, while smaller vessels can have trouble operating during adverse weather.

Shoreside Processors

AFA inshore processors There are six shoreside and two floating processors eligible to participate in the inshore sector of the BSAI pollock fishery. Three AFA shoreside processors are located in Dutch Harbor/Unalaska. The communities of Akutan, Sand Point, and King Cove are each home to one AFA shoreside processor. The shoreside processors produce primarily surimi, fillets, roe, meal, and a minced product from pollock. Other products such as oil are also produced by these plants but accounted for relatively minor amounts of the overall production and revenue. These plants process a variety of species including other groundfish, halibut, and crab, but have historically processed very little salmon. In total, the inshore processors can take BSAI pollock deliveries from a maximum of 97 catcher vessels, as of June 2000, according the regulations implemented by the AFA. The two floating processors in the inshore sector are required to operate in a single BSAI location each year, and they usually anchor in Beaver Inlet in Unalaska. However, one floating processor has relocated to Akutan. The two floating inshore processors have historically produced primarily fillets, roe, meal, and minced products.

Non-AFA inshore processors Inshore plants include shore-based plants that process Alaska groundfish and several floating processors that moor nearshore in protected bays and harbors. This

group includes plants engaged in primary processing of groundfish and does not include plants engaged in secondary manufacturing, such as converting surimi into analog products (imitation crab), or further processing of other groundfish products into ready-to-cook products. Four groups of non-AFA inshore processors are described below. The groupings are primarily based on the regional location of the facilities: (1) Alaska Peninsula and Aleutian Islands, (2) Kodiak Island, (3) Southcentral Alaska, and (4) Southeast Alaska.

Alaska Peninsula and Aleutian Islands Inshore Plants. In 1999, ten Alaska Peninsula and Aleutian Islands plants participating in the groundfish fishery. Between 1991 and 1999, almost all of the facilities reported receiving fish every year from the BSAI. In 1999, these facilities processed 66,635 round weight tons, of which 43,646 tons (66 percent) was pollock and 19,402 tons (30 percent) was Pacific cod. Also in 1999, 36,652 tons (55 percent of the total) came from the western Gulf of Alaska (WG) and 21,643 tons (32 percent) came from the BSAI.

Kodiak Island inshore plants Most Kodiak plants process a wide range of species every year, although generally fewer plants process pollock than process other species. The facilities processed a total of 101,354 round weight tons of groundfish in 1999, 51 percent of which was pollock and 30 percent of which was Pacific cod. All of the plants receive fish from the central Gulf (CG) subarea every year. Most of the plants also receive fish from the WG and eastern Gulf (EG) subareas.

Southcentral Alaska inshore plants. This group includes governmental units that border the marine waters of the GOA (east of Kodiak Island), Cook Inlet, and Prince William Sound. There have been 16 to 22 Southcentral Alaska inshore processors participating in the BSAI and GOA groundfish fishery every year since 1991. In 1999, there were 18 plants in Southcentral Alaska processing groundfish. All 18 plants reported processing Pacific cod, flatfish, and other species in 1999. In addition, 16 of the 18 reported processing pollock. The facilities processed a total of 10,846 round weight tons of groundfish, 42 percent of which was other species and 31 percent of which was Pacific cod. Virtually all of the plants receive fish from the CG subarea every year. Many also receive fish from the EG subarea, and some receive fish from the WG subarea. In 1998 and 1999, fewer than four processors took deliveries from catcher vessels operating in the BSAI.

Southeast Alaska inshore plants. This group includes plants that border the GOA east of Prince William Sound, and which operate in the inside waters of Southeast Alaska. The Southeast Alaska area has accounted for relatively small amounts of groundfish production, and these have come almost entirely from Petersburg, Sitka, and Yakutat. The main groundfish fisheries are rockfish and sablefish.

Markets

Markets for three of the most important species, pollock, Pacific cod, and Atka mackerel, have been described in detail in by Northwest Economic Associates and Knapp in Appendix D of the *Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement* (NMFS, 2001b).[19]

[19]Available on the Internet at the URL given in the references.

The reader is referred to that document for a more detailed report on these markets. The following discussion abstracts Section 5.3.2 ("Prices") of that appendix. This discussion focuses on pollock, Pacific cod and Atka mackerel because (a) the recent research for Appendix D has made information on these species relatively more available than information for other species, and (b) these three species together account for about 83% of groundfish first wholesale revenues in 2000 (Hiatt *et al.,* Table 36).

The three most important pollock products are surimi, fillets, and roe. Alaska surimi is primarily consumed in Japan where it is considered to be a premium product; available substitutes for it are relatively limited. The prices received for pollock surimi will probably be relatively responsive to the quantity supplied to the market, so that there would be noticeable price increases if supply was reduced, and price decreases if supply was increased. These shifts should moderate or offset the revenue increases that would be associated with supply increases, and revenue decreases associated with supply decreases. Similar conditions exist in the Japanese market for pollock roe.

Conditions are different in the market for fillets. Fillets tend to be sold into the relatively competitive U.S. market where there are relatively closer substitutes. Prices received for pollock fillets in that market may be relatively less responsive to changes in the quantity supplied. In this market, price changes would not tend to offset the revenue impacts of quantity changes.[20]

Pacific cod has a relatively close substitute in Atlantic cod and its price is unlikely to be strongly responsive to quantity changes. Atka mackerel from Alaska is a popular product in Japan and South Korea where most of it is consumed, and has relatively few strong substitutes. Its price is likely to be responsive to quantity changes. Thus Pacific cod price changes are relatively unlikely to modify quantity changes, while Atka mackerel prices are likely to modify quantity changes.

Safety

Commercial fishing is a dangerous occupation. Lincoln and Conway of the National Institute of Occupational Safety and Health (NIOSH) estimate that, from 1991 to 1998, the occupational fatality rate in commercial fishing off Alaska was 116/100,000 (persons/full time equivalent jobs), or about 26 times the national average of 4.4/100,000.[21] Fatality rates were highest for the Bering Sea crab fisheries. Groundfish fatality rates, at about 46/100,000 were the lowest for the major fisheries identified by Lincoln and Conway. Even this relatively lower rate was about ten times the national

[20]Technically, the demands for surimi and roe are described as relatively "inelastic," while the demand for fillets is described as relatively "elastic."

[21]To make accident rates easier to read and to compare across industries, all rates have been standardized in terms of the hypothetical numbers of accidents per 100,000 full time equivalent jobs in the business. The numerator, 116, is not the number of actual deaths; the denominator, 100,000, is probably at least five times the total number of full time equivalent jobs each year. In decimal form, this is a rate of .00116.

average.(Lincoln and Conway, page 692-693).[22] The danger inherent in commercial groundfish fishing was underscored by two accidents in March and April of 2001. In March, two men were lost when the 110 foot cod trawler Amber Dawn sank in a storm near Atka Island. In April, 15 men were lost when the 103 foot trawler-processor Arctic Rose sank about 200 miles to the northwest of St. Paul Island in the Bering Sea, while fishing for flathead sole.

However, during most of the 1990s commercial fishing appeared to become safer. While annual vessel accident rates remained relatively stable, annual fatality per incident rates (case fatality rates) dropped. The result was an apparent decline in the annual occupational fatality rate.[23] From 1991 to 1994, the case fatality rate averaged 17.5% a year; from 1995 to 1998 the rate averaged 7.25% a year. Lincoln and Conway report that "The reduction of deaths related to fishing since 1991 has been associated primarily with events that involve a vessel operating in any type of fishery other than crab." (Lincoln and Conway, page 693.) Lincoln and Conway described their view of the source of the improvement in the following quotation.

> The impressive progress made during the 1990s in reducing mortality from incidents related to fishing in Alaska has occurred largely by reducing deaths after an event has occurred, primarily by keeping fishermen who have evacuated capsized (sic.)or sinking vessels afloat and warm (using immersion suits and life rafts), and by being able to locate them readily, through electronic position indicating radio beacons. (Lincoln and Conway, page 694).

There could be many causes for this improvement. Lincoln and Conway point to improvements in gear and training, flowing from provisions of the Commercial Fishing Industry Vessel Safety Act of 1988, that were implemented in the early 1990s. Other causes may be improvements in technology and in fisheries management. The Lincoln-Conway study implies that safety can be affected by management changes that affect the vulnerability of fishing boats, and thus the number of incidents, and by management changes that affect the case fatality rate. These may include changes that affect the speed of response by other vessels and the U.S. Coast Guard.

Nevertheless, despite these implications, the exact determinants of incident rates, fatality rates, and other measures of fishing risk, remain poorly understood. In the current instance, reductions in the TAC would reduce fishing operation profitability and could lead fishermen to skimp on safety expenditures and procedures. Conversely, reduced profitability may reduce the number of active

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[22]The NIOSH study does not cover 1999-2001. Results updated through 1999 should be published in the summer of 2001; however, these results are not available at this writing. (Lincoln, pers. comm.). The rates are based on an estimate of 17,400 full time employees active in the fisheries. This estimate of the employment base was assumed constant over the time period. However, various factors may have affected this base, including reductions in the size of the halibut and sablefish fleets due to the introduction of individual quotas. These estimates must therefore be treated as rough guides. The updated results due in the summer of 2001 should include an updated estimate of the number of full time equivalent employees as well.

[23]This result is based on an examination of the years from 1991-1998. It does not reflect the losses in the winter of 2001.

fishing operations and the numbers of vessel and fishermen placed at risk. The net impacts are difficult to untangle with our existing state of knowledge.[24]

*CDQ*s

Through the Community Development Quota (CDQ) program, the North Pacific Fishery Management Council and NMFS allocate a portion of the BSAI groundfish, prohibited species, halibut and crab TAC limits to 65 eligible Western Alaska communities. These communities work through six non-profit CDQ Groups to use the proceeds from the CDQ allocations to start or support commercial fishery activities that will result in ongoing, regionally based, commercial fishery or related businesses. The CDQ program began in 1992 with the allocation of 7.5% of the BSAI pollock TAC. The fixed gear halibut and sablefish CDQ allocations began in 1995, as part of the halibut and sablefish Individual Fishing Quota Program. In 1998, allocations of 7.5% of the remaining groundfish TACs, 7.5% of the prohibited species catch limits, and 7.5% of the crab guidelines harvest levels were added to the CDQ program.

5.7 Introduction to cost and benefit analysis

The stocks of groundfish in the waters off of Alaska are a capital asset belonging to the people of the United States. Each year these stocks provide a number of different types of "income" to the people of the United States; this income includes the net revenues generated by the commercial fisheries, annual net benefits to sport, subsistence, and personal use fishermen off of Alaska, and the value of the set of ecological services (for example, Steller sea lion prey) that the fish stocks provide each year. The annual income through time associated with the resource stock has an associated present value.[25] Different sets of management decisions by the North Pacific Management Council and the Secretary of Commerce will produce different time paths for the groundfish stocks, and these will have different associated present values.

The alternatives considered in this EA/RIR/IRFA will have varying impacts on decision making by the NPFMC and the Secretary. They will affect the quality of the scientific information available, the opportunities and the value of the public input received through the Council and mandated notice and comment processes, and the amount of time available to decision makers to review this information. The impacts on the decision making process may affect the quality of those decisions,

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[24]A more detailed discussion of safety issues may be found in Section 1.3.3.4 of Appendix C to the Steller Sea Lion Protection Measure DSEIS.

[25]The benefits and costs from alternative courses of action are often felt at different points in time. One alternative may have somewhat lower net benefits, but may produce them sooner, while another alternative may have larger net benefits but at a later date. Present value analysis is necessary to make benefits and costs at different times comparable. Economists typically discount sums of income received in future years in order to convert them to present value equivalents. This is necessary since current income usually is considered more valuable than income in the future. After all, $100 dollars received now could be invested, perhaps at 5% a year, and be worth $105 a year from now. Discounting adjusts these sums into equivalents. For example, in the case just discussed, $105 a year from now might be worth ($105/1.05) = $100 now. That is, $100 invested at 5% now would be worth $100*1.05 = $105 a year from now.

and through this means, may produce changes in the present value of the groundfish stocks, when compared to the baseline present value. These changes in present value are the appropriate conceptual measure for the benefits flowing from the different alternatives.

It is impossible to do a monetary benefit-cost analysis based on this conceptual scheme. The state of the available biological and economic knowledge does not permit it. On the economic side alone, we do not have the cost information, the models of operational behavior, or the demand studies that would allow us to estimate net returns and changes in net returns. Moreover, and extremely importantly, this is an action to change the institutional context within which responsible persons (assessment authors, Council Plan Teams, SSC and AP committees, the NPFMC, and the Secretary of Commerce) will make future decisions. The decisions these persons may make are free acts - not known to us at this time. The benefits or costs of the action will depend crucially on these decisions and cannot therefore be determined. For these reasons, this RIR focuses its attention on a set of outcomes from this action that may affect the benefits and costs. In some cases it has been possible to indicate quantitative and monetary dimensions of these outcomes. These are reported where available.

This RIR reviews the outcomes of the alternatives under three general headings. First, some of the benefits and costs will flow from changes in the process by which the specifications are determined. For example, alternatives differ in the scope they provide for APA mandated rulemaking notice and comment. These procedural effects are discussed in Section 5.8, on "Impacts on the harvest specifications process." Second, Alternative 3 changes the fishing year. This alternative may impose costs and benefits by producing changes in fishing patterns. These potential impacts are discussed in Section 5.9, on "Change in fishing year under Alternative 3." Third, some of the alternatives may have implications for future harvests and stock sizes. A discussion of the reasons for this, a description of two modeling exercises meant to see if the potential impact is practically significant, and a discussion of the benefits and costs, may be found in Section 5.10, on "Changes in harvests and biomass under Alternatives 2, 3, and 4."

5.8 Impacts on the harvest specification process

The current harvest specifications process is described in Section 1.2 of this EA/RIR/IRFA. An additional description can be found in Section 2.7.3 of the Alaska Groundfish Fisheries Draft Programmatic Supplemental Environmental Impact Statement.[26] (NMFS 2001c)

Alternatives 2, 3 and 4 would alter the process by which the harvest specifications are developed and implemented in ways that may affect the transparency of the process, the opportunities for public input, and the quality of the analysis and decision making. These different elements are discussed below under the following headings: (1) opportunities for scientific analysis; (2) opportunities for public notice and comment; (3) environment for decision-making; (4) cost changes associated with these opportunities; (5) private sector planning horizons; (6) increased forecast uncertainty.

[26]Available on the Internet at the following URL: http://www.fakr.noaa.gov/sustainablefisheries/seis/intro.htm

Opportunities for scientific analysis

For the purposes of this discussion, the annual analytical process behind the specifications is assumed to start when the data from the annual summer biomass surveys conducted and reported by the NMFS Alaska Fisheries Science Center's Resource Assessment and Conservation Engineering (RACE) Division are delivered to the Center's Resource Ecology and Fisheries Management (REFM) Division for analysis. The surveys are assumed to be completed in August, with data delivery in September or October, under each of these four alternatives. The annual process formally ends with publication of the final harvest specifications in the Federal Register. However, for the purpose of this discussion of the scientific analysis, the practical end is assumed to take place when the Council makes its final recommendations for specifications (additional analysis past this point - for example public review and comment or the preparation of the Final Regulatory Flexibility Analysis (FRFA) - is treated here implicitly as a part of the Secretarial decision-making and rulemaking process).

Figure 5.8-1 illustrates the changes in time available for analysis under the different alternatives. The analytical process takes the same amount of time under Alternatives 1 and 3 (although, Option 2 to Alternative 3 would provide one additional month compared to Alternative 1). Four additional months are available under Alternatives 2 and 4 .

Figure 5.8-1 Period from summer survey to final Council action under each alternative

Alt.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	Summer survey	Survey data starts to become availabl e.Prelim inary Plan Team Meeting.	Survey data available; ; Draft EA/ IRFA; Council's proposed specs. Prelim. SAFE	Final Plan team meeting	Final SAFE; Draft EA/RIR/ IRFA; Council's final specs.				
2	Summer survey	Survey data starts to become available in September. Data analysis and model review				Plan Team Meeting. Prelim. SAFE; Draft EA/RIR/ IRFA	Council's proposed specs.	Plan Team Meeting	Final SAFE; Council's final specs.
							Revisions to EA/RIR/IRFA		
3	Summer survey	Survey data starts to become availabl e .Prelimi nary Plan Team Meeting.	Survey data available; Prelim. SAFE; Draft EA/IRFA; Council's proposed specs.	Final Plan team meeting	Final SAFE; Draft EA/RIR/ IRFA; Council final specs.	**Option 2:** Final SAFE; Draft EA/RIR/ IRFA; Council final specs.			
4	Summer survey	Survey data starts to become available in September. Data analysis and model review				Plan Team meeting. Prelim. SAFE; Draft EA/RIR/ IRFA	Council's proposed specs.	Plan Team Meeting	Final SAFE; Council's final specs.
							Revisions to EA/RIR/IRFA		
Notes: Based on Tables 2.2 and 2.3, and the description of Alternative 3 in this EA/RIR/IRFA.									

It is assumed that the RACE survey data will continue to be delivered in the early fall. Currently the RACE Division generally releases final biological survey data in this time frame. When released, the RACE data typically have gone through the normal editing/checking process, and are generally close to the final survey data and will remain the same for many years. Alternatives 2, 4, and (to some extent) Option 2 to Alternative 3 would provide RACE some flexibility to provide the data sets at a later point in time if that were necessary, and may provide some benefits compared to Alternatives 1 and 3. However, because RACE is currently able to provide carefully audited data in a timely manner, these benefits are assumed to be relatively small.

Under Alternative 1, (the status quo), and Alternative 3, stock assessment analysts in the Alaska Center's REFM Division use the RACE data to prepare the Stock Assessment and Fisheries Evaluation (SAFE) reports updating biological models with the latest survey data, and providing recommendations on appropriate ABC and OFL levels for the individual stocks. The preparation of these reports needs to be done quickly, since the survey data may only become available in September or October, and the stock assessment reports must be completed for the NPFMC's Plan Teams for their November meetings.

In November, these reports are peer reviewed at the final meetings of the NPFMC's Plan Teams. These teams make ABC and OFL recommendations to the Council for its December meeting. Additional scientific peer review is done at the Council meeting by the Council's Scientific and Statistical Committee (SSC). Peer review at the November plan team meeting and the December SSC meeting may be constrained to some extent by the short lead time with which the stock assessment analyst's reports are delivered. Option 2 to Alternative 3 would move the December Council meeting to January. This would provide the stock assessment authors additional time to analyze data and produce reports for Council consideration.

Under Alternatives 2, 4, and Option 2 to Alternative 3, more time is available for the analysts to use in conducting their analyses, preparing the SAFE reports, and for review by the members of the NPFMC's groundfish plan teams prior to their meetings. This may permit more careful analysis and more detailed peer review. The advantages for SSC peer review may be somewhat less since the SSC currently receives the SAFE analyses several weeks in advance of their meetings. Nevertheless, there may be some advantage for this part of the peer review process as well.

Several different types of environmental and socio-economic analysis of the specifications are called for under different statutes and executive orders. The National Environmental Policy Act (NEPA) calls for evaluation of the impacts of the specifications on the human environment. This includes the impacts on nature and on the human activities that are affected by the natural impacts. The Magnuson-Stevens Act has several national standards that address the socio-economic considerations. The Regulatory Flexibility Act calls for an evaluation of the impact of the specifications on small entities. Executive Order 12866 calls for a cost-benefit analysis of the specifications. All of these acts and orders require a review of a set of alternatives.

Two aspects of Alternative 1 (the status quo) make these analyses difficult to complete in a timely manner, and limit their usefulness. First the proposed specifications, published in the Federal Register in November, may be weakly related to the final specifications that will be published following the December Council meeting. The proposed specifications for a new year simply "carry forward" the specifications for the preceding year; they do not account for new information obtained from biomass surveys and observers during the past year. The final specifications will. As noted in Section 1.3 of this EA/RIR/IRFA, there can often be differences between these two sets of specifications. Environmental and socio-economic analysis prepared for the Council's October meeting and for the publication of the proposed rule, will not address the specifications that may actually be adopted, and would be of limited usefulness. Time constraints makes it difficult to integrate NEPA and the other required analyses earlier into the decision making process. The agency is currently investigating

methods for regulatory streamlining. Efforts to incorporate NEPA analyses into earlier stages of decision making are an important component of regulatory streamlining.

Second, the time period between the Council plan team's ABC and OFL recommendations and the Council's December decision-making meeting is very short. The formal delivery of the plan teams' recommendations to the Council for distribution to the SSC, the AP, and its membership, takes place almost immediately after the Plan Teams' meeting, but this only leaves the Council, SSC and AP about two weeks to review these documents. This short time frame makes detailed analysis extremely difficult and does not allow additional time for analysis of data that may be unusual.

Alternative 3 does not address this issue in a meaningful way and does not provide benefits over Alternative 1. Under Alternative 3, analysis would need to be completed by the December Council meeting. There would be no additional time to produce a socio-economic analysis following the November plan team meetings. Option 2 to Alternative 3 does provide an additional month for the Plan Teams to prepare their SAFE documents, more analytical benefit than Alternative 1 but less than Alternatives 2 and 4.

Alternatives 2 and 4 lengthen the time available for analyses considerably. If the plan team meetings change to January, there would be at least an additional month to complete the individual stock assessments for the preliminary SAFE documents. Moreover, the documents prepared at this time would better reflect specifications alternatives which would actually underlie the decision-making process of the Council in February and April.

Opportunities for public notice and comment

The four alternatives may affect the opportunities for notice and comment in two ways. First, the alternatives have different implications for the quality of the information provided to the public and on which they may comment. Second, the alternatives affect the time and opportunities for public input into the decision-making process. Alternatives 2 and 4 provide the best opportunities for notice and comment on meaningful specifications, followed by Alternative 3, and then Alternative 1.

Under Alternative 1, proposed specifications for a year, published following the October Council meeting, and prior to the preparation of the plan team SAFE reports, are generally developed by rolling over the specifications used in the previous year. For example, the actual 2002 specifications become the proposed specifications for 2003. Final regulations are published in late February or March, following the recommendations by the Plan Teams and the Council in December. However, as detailed in Section 1.3, the final regulations are not based on the same annual stock survey data as the proposed regulations. This means that the public comment period that follows the publication of the proposed specifications (and the associated IRFA) provides little or no actual opportunity to comment on these regulations. Moreover, as noted above, the time constraints and limited information available before the publication of the proposed specifications mean that it is very difficult for analysts to prepare useful environmental or socio-economic analyses of the proposed specifications, or of the final recommendations from the November Plan Teams meetings, for the Council to use for its decision-making in December.

Alternatives 2 and 4 provide improved opportunities for public comment on the decision making process. Under these alternatives, more time will be available for the preparation of the SAFE documents and associated environmental and socio-economic analyses. While final SAFE documents are now due in November, the preliminary SAFE documents and associated draft analyses would become available in January under these alternatives. These preliminary documents would be available before the SSC, the AP, and the Council take up the proposed specifications in February. Opportunities would exist for the Council to require revision of these documents before release to the public. The public should have opportunities to review these documents before scheduled final action by the Council in the April meeting. The proposed specifications, published in the Federal Register following the Council's April meeting would reflect mature consideration by the Council about what it wanted to adopt and associated analyses should be of a high quality. A public notice and comment period would be provided on harvest specifications that reflect the Council's recommendations for final harvest specifications.

Alternative 3 falls between Alternatives 2 and 4, and Alternative 1. Under Alternative 3, the proposed specifications would be adopted by the Council at its December meeting following an analysis of survey data similar to that followed under Alternative 1. NMFS would be able to publish the proposed specifications in January or February, allowing public comment on proposed specifications directly related to the final specifications. Publication of final specifications would be expected in May or June.
Option 2 to Alternative 3 would postpone the December Council meeting, and Council recommendations of specifications, from December to January. Since the Plan Team meetings would still take place in November, this would increase the time between the Plan Team meetings and the Council meeting by one month. The Plan Team meetings are public meetings and are attended by members of the public and representatives of industry and environmental groups. The one month delay in the Council meeting will therefore give these interested persons an additional month for informal consideration of information used by the Plan Teams to develop the SAFE documents.

Environment for decision-making

The four alternatives may affect the environment for decision-making in two ways. Through their effects on opportunities for analysis and notice and comment, they may affect the quality of the information available to decision makers. Second, the alternatives affect the time and opportunities for decision makers to consider the available options. The improved notice and comment opportunities should ensure that decision-makers receive the fullest input from interested and knowledgeable stakeholders and provide additional opportunity for the provision of new scientific information, and review of information already provided.

The alternatives also have implications for the time available to decision-makers to consider the consequences of their actions. Alternative 1 (status quo) does not increase the available time. Alternatives 2 and 4 do. Under Alternatives 2 and 4, the Council will review realistic specifications alternatives in February and April. The Secretary will receive the Council's recommendations following the April meeting and will have time for mature consideration during a complete notice and comment process. Alternative 3 provides additional time for notice and comment, but not as much as Alternatives 2 and 4. Option 2 to Alternative 3 would reduce the amount of time for rule making

by one month, by shifting the time into the analysis part of the process. Less time would be available to consider comments before the specifications are final. Alternative 3 requires a final rule in May or June, while Alternatives 2 and 4 do not require the final rule until the end of November.

Alternatives 2 and 4 offer some prospect of taking account of biomass surveys in the year before the specifications year. Technically, for the fishing year 2004, these alternatives would involve specifications based on the biomass surveys in 2002. The year 2003 would be spent on Council deliberations and rulemaking for the 2004 specifications. However, the 2003 summer survey information should become available in September or October 2003. This information could become available before the October Council meeting, and would become available before the final specifications had to be published. If the Council chose to respond to this new information by making substantive changes to the specifications, these changes would required regulatory action. Under NMFS policy, an emergency rule may be used to adjust TAC if there is a potential for overfishing or for an economic emergency (62 FR 4421, August 21, 1997). Use of an emergency rule for adjustments is more likely for purposes of stock conservation than for other reasons due to statutory responsibilities to protect fish stocks.

Because Alternative 3 adjusts the fishing year to July through June, there is the potential for new information to become available during the fishing year (in October) that may lead to a mid year adjustment in harvest specifications for the January through June time period. The change would need to be significant enough to justify an emergency action under the Magnuson-Stevens Act.

Additional regulatory action would take up analytical resources, occupy the Council at its October and December meetings, and impose a new rulemaking responsibility on NMFS Sustainable Fisheries. The costs associated with this activity would offset some gains from the longer rulemaking lead time. Furthermore, the additional regulatory action would offset some of the gains obtained from greater opportunities for notice and comment. It is possible that the annual opportunity to revise specifications that are too high for biological reasons would impose a responsibility on the REFM and RACE scientists at the Alaska Fisheries Science Center to review the current year survey data faster and more carefully than contemplated under Alternatives 2 through 4. This would increase the analytical burden.

Cost changes associated with these opportunities

The Option for Alternative 2, and Options 1 and 2 for Alternative 4 all involve alternative timing for a portion of the harvest specifications. The Alternative 2 Option would include biennial TAC rulemaking for target species on a biennial survey schedule. Also Option 2 to Alternative 4 would set PSC limits biennially instead of annually, as in Option 1 to Alternative 4. The Alternative 2 Option and Option 2 to Alternative 4 may lead to reduction in analytical, decision making, and regulatory inputs to the harvest specifications process.[27] Option 1 to Alternative 4 would establish annual PSC limits, requiring annual rulemaking for this portion of the harvest specifications. Additional

[27]These changes raise issues with respect to the interaction of long term harvest projections and fishery biomass trends which are discussed in detail in the Section 5.10 on "Costs."

resources would be required for the annual PSC limits, diminishing the resource savings that could be realized with the biennial harvest specifications process under Alternative 4.

Alternatives 2, and 4, and less so Option 2 to Alternative 3 provide additional time for completion of survey analysis and data modeling. Either the existing analysis would be stretched over this additional period, without the application of additional person-hours to complete the analysis, or advantage would be taken of the additional time to do increased data analysis. If additional person-hours are used, the cost of completing the analysis will be higher than otherwise.

There are administrative costs associated with Option 2 to Alternative 3. The Council schedules its meetings up to three years in advance. Changing the December Council meeting to January would require rescheduling with meeting facilities and meeting participants. Some meeting locations could potentially be changed which may result in loss of deposits on cancelled reservations. The Council may also chose to maintain at least two months between Council meetings, which would require rescheduling February, April and June meetings to March, May and July, compounding the problem of rescheduling meetings over a three year period. The International Pacific Halibut Commission also meets in January. At least one member of the Council is also a member of the IPHC, and Council meeting attendees may also need to attend the IPHC meeting.

Increased forecast uncertainty

Under Alternatives 2, 3 and 4, the time period between receipt of the most recent survey data and the specifications year will be increased. Assuming that the most recent data is the best available data, this increases the uncertainty of biomass forecasts for the specifications year. The increase in the time period will be least for Alternative 3 (about six months), somewhat greater for Alternative 2 (9 months), and greatest of all for the two year projections under Alternative 4 (9-21 months). This increased forecast uncertainty may have important implications for annual harvest and biomass levels, particularly under Alternatives 2 and 4. However, note that under Alternatives 2 and 4, the prospect of taking additional regulatory action late in the year while the final harvest specifications are actually published may reduce this source of uncertainty. These are discussed in detail below in Section 5.9.

Private sector planning horizons

Table 5.8-2 illustrates the planning horizons available to entities affected by the specifications process under the different alternatives. These entities include the fishing firms harvesting the quotas, processors to whom they deliver, coastal governmental entities depending on a share of State of Alaska raw fish tax revenues, CDQ groups and communities harvesting CDQ allocations, AFA harvesting co-ops, and other entities. Alternative 1 would provide the shortest planning horizons available to these entities. Under Alternative 1, the Council would determine its final specifications in early December, and the fishing year would begin in the following January.

Alternative 3 would extend this planning horizon somewhat. The Council would recommend its final specifications in December, as under Alternative 1, but the fishing year would not begin until the following July. Affected entities would have six months in which to plan. Option 2 to Alternative 3

would reduce this planning period by one month. Alternatives 2 and 4 would extend the planning period considerably. Under Alternative 2, the Council would recommend its final specifications in April for a fishing year beginning the following January. The planning horizon is extended to eight to nine months. Under Alternative 4, the planning horizon for the first year is eight to nine months, while the planning horizon for the second is 20 to 21 months.

Table 5.8-2 Number of months between final Council action and start of the fishing year

Alternative	Month of final Council action	Start of fishing year	Months difference
1	December	January	less than one*
2	April	January	almost nine
3	December	July	seven
3, Option 2	January	July	six
4	April	January	Depends on year, almost nine for first year, almost 21 for second year

* Even though the fishing year begins in January, the first 3 months of the year is managed using interim specifications based on the previous year's TACs. In reality, the management of the fishing year based on the Council's recommendations does not occur until the final regulations are effective in late February or March.

Longer planning horizons could be a benefit to many entities. For example, Alternatives 2, 3, and 4 may be an improvement over the no-action alternative because final annual American Fisheries Act (AFA) co-op allocations or CDQ allocations could be established prior to the start of the fishing year. Co-op or CDQ group members would have greater certainty that pollock quota leased prior to the start of the fishing year would actually represent quota that could be harvested during the fishing year. As a general rule, greater advance notice of final TAC amounts will result in greater efficiency in the cooperative markets in pollock quota. Alternative 4 would have similar effects.

One factor that may limit the benefits to these entities is the potential willingness of the Council and the Secretary to intervene late in the process or even during the fishing year given new information under Alternatives 2 through 4. This possibility was discussed above. If this became a common practice, it would offset some of this enhanced planning capability

5.9 Changes in fishing year under Alternative 3

Changes in starting dates for groundfish fishing year

Alternative 3 is very similar to Alternative 1, except that, by beginning the fishing year on July 1 rather than on January 1, the need to publish interim specifications is avoided and the notice and comment period is made more meaningful.

A hypothetical example is used here to review the details of Alternative 3. Under Alternative 3, survey data would be received from the RACE Division in September or October of a year such as 2005. Assessment authors would work with these results and generate assessment reports for review

in Council plan team meetings in November 2005. In early December 2005, the plan team reports would be reviewed by the SSC, AP and the Council at the Council meeting and the Council would prepare its preferred specifications alternative.

The Alternative 1 and Alternative 3 approaches will already have diverged by this point. Under Alternative 1, NMFS would have published proposed specifications in October, essentially rolling over the 2005 specifications into 2006. By January 2006, NMFS would also have published interim specifications allowing fishermen to harvest one-fourth of the proposed specifications. However, under Alternative 3, none of this would have happened.

Under Alternative 3, NMFS would publish proposed specifications following the December 2005 Council meeting (rather than in October) and a set of final harvest specifications in May or June 2006. These final specifications would be effective on July 1, 2006. There would be no interim specifications under Alternative 3. Option 2 to Alternative 3 would require the Council to postpone its December meeting until January, and to make its specifications recommendation actions then.

Alternative 3 has some advantages over Alternative 1 because it avoids the interim specifications, because it permits proposed specifications that are based on assessment author, plan team, SSC, AP and Council decision-making for the coming year, and because it provides improved opportunities for notice and comment. However, it does create problems that are unique to it (among the alternatives).

Under Alternatives 2 and 4 the fishing year remains unchanged. As under Alternative 1, the fishing year will begin in January and end in December. However, Alternative 3 changes the date during the year at which the fishing year begins; Alternative 3 will begin the fishing year on July1. The difference between Alternatives 1, 2, and 4 and Alternative 3 is shown below in Table 5.9-1.

Table 5.9-1 Comparison of fishing years under Alternatives 1, 2, and 4, Alternative 3, and halibut/sablefish IFQ season (in 2006 and 2007).

Alt.	Jan '06						Jul '06						Jan '07					June '07
1,2,4																		
3																		
IFQ																		

Notes: Uniformaly shaded areas show fishing years under Alternatives 1 and 2. Variable shading shows halibut and sablefish IFQ seasons.

This may have important implications. Under Alternatives 1, 2, and 4 the fishing year corresponds to the calendar year. Within the calender year there are actually many different fishing seasons for different groundfish species. However, under these alternatives, none of these seasons (or their associated allowable harvests) fall within two fishing years. Under Alternative 3, the fishing year begins in the middle of the calendar year and in the middle of the BSAI pollock and Pacific cod fishing seasons. The potential effects of the seasonal overlaps are further explained below in this section.

Fishing seasons and the fishing year

If current fishing seasons, and the division of specifications between the seasons, naturally match the new fishing year, or can be made to match the new year, there may be little problem. Table 5.9-2 discusses the seasons for the most important directed groundfish fisheries in the BSAI and discusses the implications for the proposed July-June fishing year, while Table 5.9-3 does so for the GOA.

Table 5.9-2 Timing of directed fishing seasons for major BSAI groundfish stocks with respect to a July-June fishing year

Species	
Pollock	Currently (2002) there is a fishery in the EBS, but under current Council recommendations fishing will also be allowed in the AI in 2003. Steller sea lion measures constrain the fishery to an " A"/"B" 40/60 TAC split. The " A" season ends, and the " B" season begins on June 10. Active " B" season pollock fishing begins on June 10 and lasts through October creating a conflict with a fishing year that begins on July 1. However, until recently the " B" season began at the end of July or in August. The June 10 starting date is a recent innovation associated with Steller sea lion protection measures, limited portions of the TAC have been taken in June in recent years (0.28% in 2000 and 2.1% in 2001). In years of high TAC, there may be difficulties with harvesting the full B season apportionment before the end of October, otherwise a change to July 1 may not impose a serious burden on the fishermen.
Pacific cod	This TAC is divided among a large number of fleet segments with " A" and " B" seasonal apportionments that vary by fleet segment. The " A" season ends for most of these fisheries on June 10, but the harvests will generally have actually been completed in April. The " B" season for pot gear vessels begins on September 1 and therefore creates no conflicts with a July-June fishing year. However, " B" seasons for hook and line catcher/processors, hook and line catcher vessels, trawl catcher vessels, and trawl catcher/processors all begin on June 10. While these seasons and seasonal TAC allocations overlap the proposed fishing year start date, halibut PSC limits constrain the hook-and-line fishery so that no fishing takes place around July 1. Halibut PSC releases occur on January 1, June 10, and August 15. The January release is used by June 10. Currently, no halibut are actually released on June 10, so no fishing takes place. The next actual halibut release takes place on August 15, and that is when fishing resumes. Moreover, while trawl fishermen could fish in late June and early July, they do not to any great extent. A July 1 fishing year may thus not impose serious costs. The seasons for pot CDQ fishermen and for small boat fixed gear are continuous through the year. The allocation of the CDQ share of the TAC among the CDQ groups is similar to the operation of an IFQ program. As discussed earlier, the choices these groups make about when to harvest their allocations should not be affected by the start date for the fishing year. The case is not clear with respect to small boat fixed gear operations.
Sablefish	Managed under IFQs. The fishing season opens in mid-March and closes in mid-November. The July-June fishing year may impose important costs on this fishery due to the need for a long no-fishing period between fishing years and to the convenience of having this period in the winter months. The option to Alternative 3 would eliminate these potential costs. This issue is discussed at length in Section 4.9 of this EA/RIR/IRFA, and also below in this section.
Atka mackerel	This AI TAC has an A/B seasonal apportionment with a 50/50 split. The first season runs from January 20 to April 15, and the second season runs from September 1 to November 1. The proposed fishing year should not affect the management of this fishery directly. The CDQ fishery is not subject to the seasonal allotments; fishing can take place continuously all year long. However, the allocation of the CDQ share of the TAC among the CDQ groups is similar to the operation of an IFQ program. As discussed earlier, the choices these groups make about when

Species	
Yellowfin sole	This fishery is driven by halibut prohibited species caps. These are allocated to the fishery in four increments during the year. The fourth increment is due for release on July 1. Because of this, the proposed fishing year should not affect the management of this fishery directly.
Greenland turbot	Opens May 1 for hook and line gear. No seasonal allocations. May close due to harvest of TAC or PSC. Open season may continue through July 1, so a change in the fishing year may create a problem.
Flatfish (rock sole, flathead sole, other soles, Alaska plaice)	Openings and closings in these fisheries are driven by halibut prohibited species caps. These are allocated to the fishery in three increments during the year. The third increment is due on July 1. Because of this, the proposed fishing year should not affect the management of this fishery directly.
Pacific Ocean perch	This fishery opens on July 1. Closings in this fishery are driven by harvest of TAC and by harvest of halibut prohibited species caps. The fishery is open continuously until one of these conditions is met, but the condition is usually met within a month. Because of the opening date, the proposed fishing year should not affect the management of this fishery directly.

Table 5.9-3 Timing of directed fishing seasons for major GOA groundfish stocks with respect to a July-June fishing year

Species	Seasons
Pollock	"A-B" season from January to the end of May; "C-D" season from late August to the start of November. Each season receives a separate TAC allotment. Because this fishery has two seasons, with their own TACs, one of which ends before the proposed July 1 opening date, and one of which opens many weeks after it, the proposed fishing year should not affect the management of this fishery directly.
Pacific cod	"A" season from January to June 10; "B" season from September 1 to the end of December (closing in early November for trawl gear). A season receives 60% of the TAC, B season receives 40% of the TAC. The Pacific cod hook-and-line and trawl fisheries would normally close well before June, either because the "A" season TAC allotment was taken, or because the PSC was reached. The proposed fishing year should not directly affect the management of this fishery.
Sablefish	Managed under IFQs. The fishing season opens in mid-March and closes in mid-November. The July-June fishing year may impose important costs on this fishery due to the need for a long no-fishing period between fishing years and to the convenience of having this period in the winter months. The option to Alternative 3 would eliminate these potential costs. This issue is discussed at length in Section 4.9 of this EA/RIR/IRFA, and also below in this section.
Demersal shelf rockfish	Two directed fishing seasons. 70% of TAC available from January 1 to March 15, 30% available from November 15 to December 31. In this fishery deductions are made from an annual TAC for halibut and groundfish bycatch, and the remainder is divided between the two seasons above. The bycatch harvest is not currently monitored and doesn't affect the two seasonal TACs. A July-June fishing year may not affect the management of these fisheries.
Deep water flatfish	These species are all exploited by trawl gear. There are no seasonal allocations, only one annual allocation. The harvests from these fisheries are limited by PSC allocations which are released in five annual increments to the fishermen. The second PSC allotment is released on April 1, and the third PSC allocation would be released on or about June 30. Trawl fishing is usually closed before June due to harvest of the PSC allocation. Because harvests normally cease due to PSC limits before June, and a new PSC allotment is released about June 30 (or July 1) a new July-June fishing year may not affect these fisheries directly.
Rex sole	
Flathead sole	
Shallow water flatfish	
Arrowtooth flounder	
Pacific Ocean perch	These are usually managed by their TAC. The rockfish fishery opens by regulation around July 1. The trawl fleet also gets a halibut allocation around July 1, which they need to fish rockfish.
Northern rockfish	
Pelagic shelf rockfish	

Are there fisheries which may not readily adapt?

In general, Tables 5.9-2 and 5.9-3 suggest that the July to June fishing year under Alternative 3 may not directly conflict with existing fishing seasons in many fisheries. However, the sablefish fishery in the BSAI and in the GOA, and the BSAI pollock fishery may be exceptions.

The possible impacts of Alternative 3 on the sablefish fishery were described in detail in Section 4.9 of this EA/RIR/IRFA. Although the sablefish fishery is managed with IFQs, the interactions between the sablefish fishery and the halibut fishery, the need for a closed fishing period between fishing years in this IFQ program, and the potential losses from placing the closure during the good weather in the spring, all created important problems for this fishery under Alternative 3.

Currently, the halibut and sablefish IFQ fisheries are closed to directed fishing between mid-November and mid-March. This closed period is important in the management of the fishery. This is a period of time in which the "books are cleared" and administrative groundwork is laid for the coming season.

The annual IFQ calculation process for the new fishing year cannot start until all fishing and deliveries for the current year have stopped and the IFQ accounts are stable, because the new year's permits are a function of the final account balances from the previous permits. Halibut may not be retained, and directed fishing for IFQ sablefish stops, in mid November although sablefish bycatch which accrues against IFQ permits occurs through December. Some vessels, especially larger freezer vessels, may take 2 to 3 weeks before completing their last landings after the close of the fishery.

NMFS uses the time period between the end of the fishing year (December 31) and the start of the IFQ season (mid March) to perform a number of management steps. These steps include: 1) establish final TACs, 2) stabilize accounts (landings completed, corrections made and quota transfers are stopped), 3) calculate, print, and mail permits, 4) allow for fair start, and 5) collect IFQ fees. TAC setting requires review and publication of sablefish harvest specifications in the Federal Register, and Governmental approval and publication of the halibut regulations established by the IPHC for halibut. After landings are completed and information is stable, NMFS calculates overages and underages which apply to next year's IFQ accounts; and also distributes the new TAC to all current quota share holders. New year IFQ permit calculations are completed on or about January 31 at which time the printing and distribution steps begin. The participants in the IFQ fisheries normally are mailed their permits in February so that permits can be received and all participants, even those in remote locations, are able to participate on the opening date of the fishery, which historically has yielded the highest exvessel prices. The processes of implementing TACs, account stabilization; calculating, printing, issuing, and mailing permits; and collecting fees, takes approximately six weeks of time when no fishing may occur between the fishing years. This intermission is also needed to implement revised reporting and recordkeeping requirements and new electronic reporting software; to issue registered buyer permits, and to process IFQ leases and hired skippers applications.

As discussed in Section 4.9, a number of problems are created if the closed period in the fishery is shifted from its current mid-November to mid-March period to the four month period prior to a July 1 opening (March to June). The new opening would occur during some of the best weather

conditions of the year, when fishing was productive and safety issues were at a minimum. Moreover, a winter fishery from November through February would take place at a time when halibut were found in deeper waters and there was more spatial overlap with sablefish, increasing potential bycatch problems.

While the sablefish fishery dates can be adjusted by NMFS with the Council's recommendation, halibut fishing seasons are established by the IPHC and may not coincide with any changes made to the sablefish fishery. If the sablefish season were not concurrent with the halibut IFQ (and CDQ) season, waste and discard of halibut would occur in the sablefish fishery; and of sablefish in the halibut fishery. In particular, it is undesirable to allow sablefish fishing in winter, when halibut are deep and have a much more spatial overlap with sablefish, increasing halibut bycatch potential[28].

IFQ permits could be issued on the proposed TAC rather than the final TAC. If the TAC and/or area allocations changed between the proposed and final rulemaking, new permits would need to be processed and issued. This scenario raises the possibility of two sablefish permitting processes in one year and the additional down time that would be required. There also is a potential for: (a) exceeding a quota if the final annual TAC decreased, yet fishing in excess of that had already occurred, and (b) exceeding an area allocation or even the entire TAC if by the time the final annual TAC was known to decrease, fishing in excess of that amount had already occurred.

Under the current IFQ program, a number of regulation changes may mitigate some of the difficulties of having inadequate time for intercessions between different allocation periods. Multi year permitting and other program changes could reduce the time needed, or reduce the frequency of stand down periods. Numerous regulation changes may also be made such as: shifting cost recovery program reporting and payment schedules, adjusting the date before which IFQ permits may not be calculated, and revising logbook submission dates. Removing the provision for applying overages and underages to the following year's IFQ permits would mean the following year's IFQ permits could be calculated based solely on quota shares held and the new year's TACs; only transfer activity would need to halt temporarily. If Alternative 3 was implemented, significant management and regulation changes to the IFQ program would be necessary to ensure the sablefish and halibut IFQ programs are implemented concurrently, fairly, and with little disruption. These changes and potential problems can be avoided if the option (set sablefish TAC for the January through December time period) to Alternative 3 is implemented.

As noted in Section 4.10, under the AFA, close to 100% of the BSAI directed pollock fishery has been allocated to fishery cooperatives. In all three sectors of the BSAI pollock fishery, cooperatives function as a form of privately-operated individual fishing quota program. Within each cooperative, member vessels are granted an allocation of pollock based on their catch history and are free to lease their quota to other members of the cooperative, or acquire quota from other members to harvest. The catcher/processor and mothership sector cooperatives operate at the sector level in that NMFS makes a single allocation to the sector and the cooperatives are responsible for dividing up the quota

[28]Gregg Williams, Senior Biologist, Personal Communication, April 25, 2002, International Pacific Halibut Commission, P.O. Box 95009, Seattle, WA 98145-2009, U.S.A.

among individual participants in the sector. Inshore sector cooperatives are organized around each processor and NMFS makes individual allocations to each cooperative rather than to the inshore sector as a whole.

Alternative 3 would have mixed effects on the management of the AFA pollock fishery. On the one hand, final pollock quotas would be established prior to the start of any pollock fishing which should lead to greater efficiency in cooperative management. However, changing the fishing year would have greater effects on the AFA pollock management regime which is currently based on the calendar fishing year. Adoption of Alternative 3 would affect existing regulations that establish application deadlines for AFA pollock cooperatives and reporting deadlines for annual co-op reports. Initially these changes would be more disruptive than adoption of Alternative 2.

The AFA pollock fishery may also experience a number of additional potential problems with the shifting of the seasonal end date from June 10 to July 1 under Alternative 3. During years of high TAC, it may be difficult to harvest the 60 percent allocation in the B season because the time available would be reduced by 3 weeks. Also, the effort of fishing would be shifted out of June which is a time of low salmon bycatch toward later in the year when salmon bycatch rates are higher. There may also be difficulties in processing all of the TAC in the second season if the markets for surimi and fillets are not strong and the plants would operate less efficiently by not simultaneously processing these products. The pollock processing facilities are also used for crab processing which begins in mid October, so it is desirable to have the pollock fishery completed before the crab fishery begins.[29]

"Rollovers" under Alternative 3

Sometimes fishermen are unable to completely harvest amounts of fish seasonally available to them. Often, in these instances, NMFS in-season managers are able to "rollover" some or all of the unfished portion to a subsequent fishing season during the same fishing year, giving fishermen a second chance to harvest it. Rollovers can take place within a gear group, or from one gear group to another. Currently, the opportunity exists to rollover fish that are not harvested in the January to June period to the second half of the year, July through December. Fish not harvested in the second half of the year are lost when the new fishing year begins in the following January.

Under Alternative 3, the period from July to December will be the first season of the fishing year, and the period from January to June will be the second season. Any fish not harvested from January to June will be lost when the new fishing year begins in July. In the past, these fish might have been rolled over to the following season. Moreover, the Steller sea lion protection measures establish a fixed amount of harvest in the first season (January through February, April or June, depending on the species and area). Under current protection measures, managers will not be able to rollover fish not harvested from July to December into the season starting in January.

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[29]Christian Asay, Catcher Vessel Fleet Manager /Coop Manager, Personal Communication, August 13, 2002, Trident Seafoods, 5303 Shishole Ave., Seattle, WA 98107

The Steller sea lion protection measures establish seasonal apportionments for pollock, Atka mackerel, and Pacific cod, and these are the only groundfish fisheries that may be affected by changes in the ability to do rollovers. These species are unusually important to both the Steller sea lions and fishermen during the first part of the year. They are an important source of food for the Steller sea lions during an environmentally stressful period, and they have an unusually high value for the fishermen due to their high roe content at this time. The seasonal specifications set for the harvests of these species in the first half of the year are set so as to ensure that the prey available to the Steller sea lions will not drop to low levels that would jeopardize Steller sea lion survival or adversely modify their critical habitat. Harvests above these levels, for example, to harvest fish rolled over from the previous season, may cause the temporal depletion of Steller sea lion prey and could not be considered without reconsultation on the current biological opinion.

The directed pollock fishery in the BSAI is conducted under cooperative arrangements introduced by the AFA. The cooperatives maintain careful control over their harvests, and are likely to be able to arrange their operations so as to harvest seasonal quotas. Rollover issues are not expected to be important in the directed fishery. Pollock incidental catch allowances (ICA) may be of more concern. Usually, the unused ICA is reallocated to the pollock fishery after the A season. Between 1999 to the present, approximately an average of 8,000 mt of pollock ICA has been rollover to the B season. About a third of the pollock bycatch occurs in March and April, after the important pollock roe season, and if the industry does not fully use the ICA, it may be lost to the fishery.

In the BSAI Pacific cod fishery the rollover occurs from trawl & jig gears to hook-and-line and pot gear in September. The BSAI cod hook-and-line gear rollover in September depends on the January through April trawl fishery needs for the directed fishery and trawl bycatch needs in other non-cod fisheries. The bycatch needs in other trawl fisheries are fairly consistent. The major Pacific cod trawl and hook-and-line fisheries in the January to June period occur in March and April, when the Pacific cod are concentrated in spawning condition, and after other roe fisheries have slowed down. If trawlers are unable to fully harvest their allocations in March and April, there is an opportunity to rollover the fish to a hook-and-line fishery in May and June. With the Pacific cod directed trawl fishery occurring at the end of the fishing year, and a very limited opportunity for hook- and-line gear sector to fully harvest rollover amounts in May and June, some fish may be lost. It is also not clear that the hook-and-line fishermen would be fully able to take advantage of the rollover due to high halibut by-catch at that time of year. Therefore, there is a good chance that, if the trawl fishermen are unable to fully harvest their allocation, the fish will not be harvested in that year.

Rollovers from the September-November season to the January - April season for the Atka mackerel fishery would not be possible because of the 50 percent seasonal apportionment required in the Steller sea lion protection measures. This type of rollover would concentrate more of the Atka mackerel fishery in the time period important for foraging Steller sea lions. Atka mackerel not harvested in the fall would likely be lost to the industry.

In the case of the Gulf of Alaska pollock fishery, under the new system with the August and October fisheries occurring first, managers could have either more fish than expected in the January or March fishery, or less, depending on the in-season management of the late summer and fall fisheries. Current Steller sea lion protection measures allow for rollover of unharvested pollock from one

season to the next as long as no more than 30 percent of the annual TAC is apportioned to any one season. Rollover from the D season (October to November) to the A season (January to February) will not be allowed because of the 25 percent limit established by Steller sea lion protection measures for the first season. The Steller sea lion protection measures allowed for rollovers from seasons in the early part of the calendar year to later seasons. The analysis in the 2001 Biological Opinion was based on a fixed amount of harvest in the early part of the calendar year (NMFS 2001b). Because of the 30 percent limitation on the amount of rollover and the number of seasons, rollovers in the GOA pollock fisheries are possible under Alternative 3. Therefore, Alternative 3 is less likely to have an effect on the GOA pollock fishery.

Presently there is a directed GOA Pacific cod fishery of 60% of the annual TAC in January through June. If 40% were harvested in the fall, then the directed fishery could not be allowed to take the full 60% since it would be necessary to set aside some of the TAC for incidental catch through the end of June. This consideration will affect the timing of the closure of the directed fishery in February or March. The closure must be timed to leave sufficient Pacific cod quota for bycatch needs in the April and May flatfish fisheries in the GOA. If too much Pacific cod quota is left for bycatch needs, it would be lost when the fishing year ended in June. It is unclear if unused Pacific cod quota in the fall can be used for bycatch in the January through June time period. NMFS Sustainable Fisheries Division is currently consulting with the Protected Resources Division to determine if rollover used for bycatch purposes during the A season poses Steller sea lion concerns.

Limited time for rulemaking

While Alternative 3 calls for a fishing year that begins on July 1, the time required to prepare and publish a Federal regulation may make it hard to meet this deadline. The elements of the rulemaking process are described in Section 1.2 of this EA/RIR/IRFA.

Following the Council's December meeting, the proposed rule containing the specifications, along with its preamble and supporting documents, must be prepared by the NMFS Sustainable Fisheries Division. The annual specifications rule is complicated, and it can take several weeks after the Council meeting to prepare. Before the proposed rule can be published, it must be reviewed by several offices within the Alaska Region including NOAA Enforcement, NMFS Protected Resources, and NOAA General Counsel. It must also be reviewed by several offices in Washington, D.C. including NOAA General Counsel, and the Department of Commerce General Counsel. As noted in Section 1.2, in future years, the Federal Office of Management and Budget is more likely to treat the annual specifications as a "significant" document within the terms of E.O. 12866. This means OMB may require its own review of the proposed rules (which can take up to 90 days) before the proposed rule can be published.

A 15 to 60 day notice and comment period is required following publication of the proposed rules. Once this period ends, NMFS Sustainable Fisheries must address the comments received and prepare a final rule. Any changes in the final rule from the proposed rule must go through an internal NMFS vetting process. Under the APA, the final rule cannot become effective for 30 days following its publication in the Federal Register, unless good cause exists to waive all or a portion of this cooling off period.

It is possible to complete this process between the end of the December Council meeting and the July 1 opening date. However, there are also a number of uncertainties in this process which may make it difficult to implement the final regulations by July 1.

5.10 Changes in harvests and biomass under Alternatives 2, 3, and 4

Truncation of harvest by interim specifications

In the past, interim TACs have been set based on 25 percent of the recommended TAC for some fisheries. This 25 percent level is an artificial constraint which could deny access to the full amount of the annual quota by fishermen who, for market, product, or logistical reasons, fish intensely early in the year (before final specifications are issued).

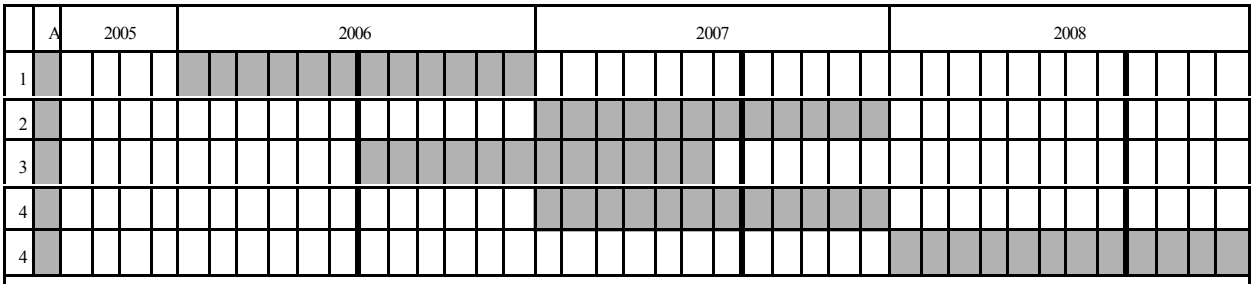
Retention of the status quo alternative could, therefore, result in a closure of one or more of the groundfish fisheries in the BSAI and GOA management areas if, for example, NMFS cannot publish final specifications before the interim TAC levels are reached. This would result in severe negative economic impacts on all those dependent upon the fishery or fisheries in question, especially for those fishery participants who concentrate fishing effort early in the fishing year. In particular, pollock and fixed gear cod fisheries have a high probability of attaining interim TACs in any given year, under the status quo alternative. This potential attainment of the interim TACs and subsequent short-term closure of important fisheries could have a significant adverse impact on vessels, processors, and the affiliated industries and communities that support and are supported by them.

In addition, PSC limits (which can result in closure of fisheries with resulting social and economic impacts) may be limiting during the interim period, particularly to the BSAI rock sole fishery which operates early in the fishing year, under the status quo alternative. If the interim 25 percent PSC limitations restrict fisheries, fishermen would forego potential revenues during the interim period, perhaps without the ability to subsequently recoup those losses.

TACs lag biomass longer

Alternatives 2, 3, and 4, all increase the period of time between a summer biomass survey and the opening of the fishing season whose specifications are based on that survey. The changes in the elapsed time between the summer surveys and these fishing seasons are shown in Table 5.10–1. Under Alternative 1, the 2006 fishing season once final regulations are in place, would be based on a biomass survey made in the summer of 2005. (It is important to note that under the status quo, interim specifications in 2006 would reflect a biomass survey in 2004, not in 2005 (since the interim specifications would be based on a rollover of 2005 specifications)). Under Alternative 2, the 2007 fishing season would be based on a survey done in 2005, under Alternative 3, the 2006-2007 fishing season would be based on a survey done in 2005 (introducing a half-year lag), and under Alternative 4, the 2007 and 2008 fishing seasons would be based on a survey done in 2005.

Table 5.10-1 Elapsed time between August 2005 summer survey and specifications year under different alternatives



Notes: Alternative 1 in the first 3 months is actually managed through interim specifications, therefore the management of the fishery based on the latest Council recommendation does not occur until approximately March, resulting in a 7 month lag time between available information and implementation of the fishery.

The different lags between the summer biomass surveys and the fishing year specifications based on those surveys introduce additional uncertainty into the specifications process. The actual biomass in the fishing year may be higher or lower than the biomass measured in the summer survey, and as the lag between the survey and fishing year increases, the potential for discrepancy between the measured biomass underlying the specifications decisions and the actual biomass during the fishing year also increases. Since ABCs and TACs adjust to biomass fluctuations with a lag, biomass tends to change by larger amounts before changes are offset by harvest adjustments.

The uncertainties are greater for species that have shorter life spans. In these instances, the biomass will contain relatively smaller numbers of year classes. Each year's recruitment of a new year class to the biomass will have a relatively bigger impact on the size of the biomass. Thus, the biomass size (the weight of all existing age classes) is likely to fluctuate more for a species with a short life span than for a species with a longer life span, even if the variability in recruitment is the same for the two species.

Two analyses carried out at the Alaska Fisheries Science Center[30] suggest that these theoretical considerations may have practical implications for the alternatives. These analyses are described in the following two sections of this discussion as (a) the retrospective analysis, and (b) the simulation model.

The retrospective analysis draws conclusions by "looking back" at the period from 1991 to 2002. The simulation model simulates the results of the specifications setting process 1,000 separate times and evaluates the means and variations from these simulations. The retrospective analysis captures some of the elements of Council specifications setting, while the simulation model focuses to a greater extent on the impact of increased forecasting lead times on biological modeling.

[30]The retrospective analysis and simulation model described below were developed by Dr. James Ianelli of the Alaska Fisheries Science Center REFM Division in the spring of 2002.

The retrospective analysis

As they prepare their annual SAFE analyses, assessment authors often generate ABC estimates for the coming year and project estimates even further into the future. In the "Retrospective analysis," second year ABC projections from this process for four important species are treated as Alternative 2 specifications, and are compared to the ABCs generated for the SAFE analysis in the following year, which are treated as Alternative 1 specifications. Both sets of ABC estimates are implicitly treated as estimates of TACs resulting from the specifications process.

Concretely, in the fall of 2000, assessment authors would have produced ABC estimates for the 2001 specifications. They would also have projected an estimated ABC for the following year, 2002. This projection was not a specification for 2002, and in fact would be superceded in the specifications process for 2002 by an ABC estimate to be produced in the fall of 2001. In this retrospective analysis, the 2002 projection made in 2000 is treated as an Alternative 2 specification for 2002 and is compared to the 2002 specification made in 2001, which is treated as an Alternative 1 specification for 2002.

The second year projections do not correspond exactly to the ABC estimates that would be prepared under Alternative 2. The second year projections used here were prepared under the time constraints of Alternative 1, and are subject to the limitations imposed by those constraints. They do not, for example, reflect recent catch data to the same extent ABC specifications developed under Alternative 2 might. Moreover, these second year projections are the assessment authors' projections, and do not reflect changes that might have been made in the SSC and the Council.

The retrospective analysis was performed for four species: (1) Eastern Bering Sea (EBS) pollock; (2) Bering Sea and Aleutian Islands (BSAI) Pacific cod; (3) Aleutian Islands (AI) Atka mackerel; (4) Gulf of Alaska (GOA) pollock. These species were chosen because of their importance in the fisheries, and because the ABCs and TACs in these fisheries are often relatively close together (although high EBS pollock ABCs are associated with large discrepancies between ABC and TAC during this period).[31]

Some results of this comparison are summarized in Table 5.10-2 below.[32] The table shows the change in metric tons associated with the substitution of Alternative 2 for Alternative 1.

[31]The estimates were based on observations from 1991 to 2002 for GOA pollock (12 observations), from 1992 to 2002 for EBS pollock and BSAI Pacific cod (11 observations), and from 1993 to 2002 for AI Atka mackerel (10 observations).

[32]Figures showing the paths of the specifications under the two alternatives and another table summarizing the results may be found in Section 4.1.3 of this EA/RIR/IRFA.

Table 5.10-2 Estimated change in metric tonnage associated with Alternative 2 under the retrospective analysis

Species	ABC in metric tons under Alternative 1	Change in annual metric tons under Alt. 2.	Percent change in ABC
EBS pollock	1,299,000	-33,000	-2.5%
BSAI Pacific cod	219,000	+16,000	7.3%
AI Atka mackerel	95,000	-8,000	-8.4%
GOA pollock	92,000	+10,000	10.9%
Notes: The metric tonnages from which these changes were derived may be found in Table 4.1-1 of this EA/RIR/IRFA.			

Applying 2000 first wholesale prices to the changes in TAC from the retrospective model implies a net impact on gross revenues from these four species of about +$2 million.[33] A net impact of this size is so small that it is not practically meaningful, given the other large sources of revenue fluctuation in these fisheries, the extent of the fisheries not considered here, and the large sources of uncertainty in the model itself.

However, the results for individual species can have a meaningful impact. The absolute values of the percentage changes in the ABC/TAC vary between 2.5% for the EBS pollock, and 11% for the GOA pollock. The dollar value changes can be large. For EBS pollock and BSAI Pacific cod they are in the tens of millions of dollars (although one change is an increase in revenues and one is a decrease).

Table 4.1.1 in Section 4.1.3 of this EA/RIR/IRFA reports coefficients of variation for the ABCs under the retrospective analyses. These showed little pattern. In two instances they increased, in two they decreased. The results do suggest that the alternatives may affect the variability as well as the level of the specifications.

The simulation model[34]

The simulation model is focused on the biological interactions between the fish stocks and the stock assessment procedures for determining ABCs. The simulation model permits a more detailed investigation of the interaction of biology and assessment determination and makes it possible to look at more species. While the simulation model has certain advantages over the retrospective

[33]The revenue estimates were made using estimates of first wholesale prices per metric ton of landed round weight provided by Terry Hiatt in a personal communication. For EBS pollock these prices were $1,041 for the first half of the year and $555 for the second half. For BSAI Pacific cod they were $1,392 in the first half and $1,250 in the second half. For Atka mackerel they were $474 in the first half and $480 in the second half. For BSAI Pacific Ocean perch it was an annual average of $514. For GOA pollock it was an annual average of $870. For sablefish it was an annual average of $4,997.

[34]Another description of this model may be found in Section 4.1 of this EA/RIR/IRFA.

model, it doesn't consider the Council context within which the specifications were determined as well as the retrospective approach does.

Simulation models were run for EBS pollock, BSAI Pacific cod, AI Atka mackerel, BSAI Pacific Ocean perch, GOA pollock, and BSAI/GOA sablefish. Separate simulations were performed for each of these species for Alternatives 1, 2, and 4. Simulations were not run for Alternative 3, but the results for this Alternative should fall between those for Alternatives 1 and 2. The implications of these simulations for Alternative 3 are discussed later. The operation of the simulation model for Alternative 2 is described immediately below; and a discussion of the modifications necessary for the simulation models under Alternatives 1 and 4 follows. The simulation models for the different species were the models used by the assessment authors when they prepared their 2002 ABC and OFL recommendations in the Fall of 2001. In other words, these models use the equations and parameter estimates used at that time.

Under Alternative 2, in a typical simulation year such as 2007, the model receives several inputs and generates several outputs for future years. The important inputs include: (a) random recruitment into the fish stock generated using the mean and variance of historical recruitment for that stock; (b) an ABC set in the previous year (2006 in this example) based on stock biomass estimates from the year before (2005 in this example); (c) an actual stock biomass and age structure produced as an output from the simulation for the previous year (again, 2006 in this example).

The model simulates the impacts of these inputs on the fishery in 2007. Recruitment adds a new year class of a certain size to the fish stock. The biomass for each age class at the start of the year (aside from the recruited age class) is determined by outputs from the end of the previous year's simulation. Age class specific parameters for growth and mortality, built into the model structure, act on each age class to determine its year-end biomass. In a crucial simulation element, the ABC that was an input into the year's simulation is used as an estimate of the harvest during 2007, and each age class is reduced appropriately to account for this harvest.

Each year's simulation produces two important outputs that serve as inputs into the simulations for subsequent years: (a) a biomass and age structure for the stock that is input into the next year's (2008 in this case) simulation; and (b) a biomass structure that determines the ABC for the fishery two years out (2009 in this case).

The simulations were begun with the 2001 fishing year and were run for 1,000 years. Each year's recruitment was generated by a randomly chosen number, specific to that year. The random number sequence was the same for each alternative's series of annual simulations. The random numbers reflected the historical mean and variance of recruitment in the fishery. The historical period began in 1978 and continued through the most recent (that is "well estimated") year class. The most recent year class varied by species. For example, for EBS pollock, the most recent well estimated year class was the 2000 year class.

The simulations for Alternatives 1 and 4 have the same basic structure, but the connection between the years whose biomass information is used to set the specifications (referred to hereafter as a "biomass information year"), and the year for which the specifications are determined (hereafter the

"specifications year"), differ. Under Alternative 1, the biomass information year is the year before the specifications year. So in the 2007 example above, the biomass information year would be 2006 (instead of 2005 as under Alternative 2). Under Alternative 4, specifications are determined for two years into the future. Assuming that 2005 was the biomass information year, the specifications would be determined for 2007 and 2008.[35]

The discussion in Section 4.1 of this EA/RIR/IRFA points out that the simulation model predictions have not been tested by simulating the model with historical inputs and comparing the model results with historical results, and that they have not received peer review. A comparison of simulation pollock ABCs with historical pollock ABCs showed that the simulation ABCs for all alternatives were generally higher than historical ABCs. The implication was that the levels of ABCs projected by the models were less reliable than the directions of change in ABC that they indicated.

The discussion of the simulation model results that follows will review estimated impacts on ABCs (used in the model as harvest estimates), spawning biomass levels, and year-to-year variation in ABCs and spawning biomass levels. The discussion will actually begin with year-to-year variation in spawning biomass levels. This is done because the factor apparently driving the model is the increased lag which impacts this variability. Increased spawning biomass variability in turn affects the ABC and harvest level, which impacts the size of the spawning biomass.

The simulations suggest that mean spawning biomass fluctuates more as the lag between the biomass information year and the specifications year grows. The spawning biomass fluctuations tend to be greater for Alternative 2 than for Alternative 1, and greater for Alternative 4 than for Alternative 2. The fluctuations for Alternative 3 are believed to lie between those for Alternatives 1 and 2. Moreover, the fluctuations appear to be systematically related to the biological characteristics of the fish species. The option to Alternative 3 to set the sablefish TAC on a January through December schedule is similar to Alternative 2 for sablefish. The simulation model showed that for sablefish, a longer lived species, there was little additional effect on biomass or harvest levels with projections of ABC under Alternative 2 compared to Alternative 1.

Table 5.10-3 uses coefficients of variation to show how the spawning biomass variability changes for Alternatives 1, 2, and 4. Larger coefficients indicate greater variability relative to the mean biomass. Each of these simulations is run for 1,000 years. The coefficient of variation for each alternative and species combination is equal to the standard deviation of the annual spawning biomasses divided by the mean annual spawning biomass for those 1,000 yearly observations. The coefficient of variation provides an index of the variability of the spawning biomass compared to its average value. Increases in the index suggest that the variability increases compared to the mean spawning biomass. Table 5.10-3 shows that the coefficient of variation tended to increase for each species as the length of time between the biomass information year and the specifications year increased.

[35]The relationship between the year for which the biomass information is available and the specifications year is illustrated in Table 5.10-1, above.

Table 5.10-3 Coefficients of variation calculated for the spawning biomass under Alternatives 1, 2 and 4.

Species	Alternative 1	Alternative 2	Alternative 4
EBS pollock	.274	.322	.355
BSAI Pacific cod	.167	.202	.243
AI Atka mackerel	.273	.406	.424
BSAI Pacific ocean perch	.074	.074	.076
GOA pollock	.386	.503	.540
Sablefish	.262	.281	.300
Notes: These CV estimates are summarized from Table 4.1-2 of this EA/RIR/IRFA			

The increases in the coefficients differed among the species. The difference was small for Pacific Ocean perch and larger for EBS pollock, BSAI Pacific cod, GOA pollock, and AI Atka mackerel. The increase for sablefish fell between the extremes. The differences tended to be greater for species that had relatively short life spans.

As discussed earlier, spawning biomass is likely to become more variable under alternatives that increase the period between the biomass information year and the specifications year. ABCs and TACs specified further into the future will be based on biomass estimates that will be lower or higher than appropriate given the actual biomass (in the future). This causes the biomass to increase or decrease even more than it otherwise would have before the ABCs and TACs adjustments, leading to increased spawning biomass variability.

This increase in the variability of the biomass under Alternatives 2 and 4 leads to a reduction in the average ABC. Under the simulation model the average ABCs (treated as equivalent to average harvests in this discussion) decreased with the length of time between the collection of the biomass survey data and the start of the fishing year whose ABC was based on it. The averages were largest for Alternative 1, smaller for Alternative 2, and smallest for Alternative 4. Alternative 3, which has a lag between those for Alternatives 1 and 2, is assumed to have an ABC reduction greater than that for Alternative 1, but less than that for Alternative 2.

As with the impacts on spawning biomass, these changes in ABC levels are systematically related to the biological characteristics of the stocks; stocks with shorter life spans have a relatively larger reduction in ABCs (which are treated in the model as proxies for harvest). The reductions in ABCs are a direct result of the increased biomass variability just discussed.

A key reason for this reduction in ABCs was the increased variability of the fishable biomass under Alternatives 2, 3, and 4 and the interaction of this variation with the harvest control rules (HCR) used in some of these fisheries. Fishing rates and ABCs in the fisheries discussed here depend to some extent on an HCR which lowers the acceptable fishery mortality rate as the estimated biomass is reduced. With the larger year-to-year variation in the biomass estimates, the low end of the

spawning biomass relative to the unfished level will be lower more often, and will trigger reduced ABCs associated with lower fishery mortality rates more often.

A second key reason is the use of median recruitment (rather than mean recruitment) for projecting biomass to the specification years. This will result in somewhat lower ABC specifications but does reflect common practice in North Pacific groundfish stock assessments. That is, deterministic projections are often done with a conservative (e.g., median) recruitment assumption.

Changes in the average level of harvest would change the gross revenues and profits accruing to industry. To some extent, the impact of changes in harvest would be mitigated by offsetting shifts in product prices. For example, all other things equal, a reduction in pollock harvest would be expected to lead to an increase in the price of pollock. To some extent, this offsetting price shift would tend to mitigate the negative revenue impacts in this case. Similarly, higher pollock harvests would be associated with somewhat lower prices, offsetting the potential for revenue increases to some extent.

The simulation model results for changes in the average annual level of harvest under Alternative 2 are summarized in Table 5.10-4. This table shows the ABC under Alternative 1, the average change in the level of harvest from Alternative 1 to Alternative 2, and the percentage change in the harvest. Similar results for Alternative 4 are shown in Table 5.10-5 which immediately follows Table 5.10-4.

Table 5.10-4 Estimated change in ABC associated with Alternative 2 from simulation analysis

Species	ABC in metric tons under Alt 1	Change in ABC in annual metric tons under Alt. 2	
EBS pollock	1,498,000	-24,000	-1.6%
BSAI Pacific cod	278,000	-4,000	-1.4%
AI Atka mackerel	98,000	-10,000	-10.2%
BSAI Pacific ocean perch	16,000	0	0
GOA pollock	162,000	-17,000	-10.5%
Sablefish	26,000	0	0
Notes: These estimates are summarized from Table 4.1-2 of this EA/RIR/IRFA			

Table 5.10-5 Estimated change in ABC associated with Alternative 4 from simulation analysis

Species	ABC in metric tons under Alt 1	Change in annual metric tons under Alt. 4	Percentage change in ABC
EBS pollock	1,498,000	-50,000	-3.3%
BSAI Pacific cod	278,000	-9,000	-3.2%
AI Atka mackerel	98,000	-14,000	-14.3%
BSAI Pacific ocean perch	16,000	0	0
GOA pollock	162,000	-26,000	-16.0%
Sablefish	26,000	-1,000	-3.8%
Notes: These estimates are summarized from Table 4.1-2 of this EA/RIR/IRFA			

These results must be read cautiously. Their interpretation is complicated by several factors. As noted earlier, the magnitudes of these values may be less important than the direction of change. A second issue is that in some instances, for example BSAI pollock under Alternative 2, the percentage change in the ABC is small. Third, and related to this, variances of the simulation results around the mean estimates are large. The coefficients of variation for these results may be found below in Table 5.10-7. These large variances reflect the high degree of natural variability characteristic of some groundfish stocks. Hence, the difference found between alternatives is swamped by the expected variability within all alternatives. Statistical tests between the alternatives based on the simulations are inappropriate since the sample size could simply be increased by running more simulations.

The results do show systematic patterns which add to their credibility. Mean ABCs tend to get smaller as the length of time between the biomass information year and the specifications year gets longer for these species. Moreover, the effect tends to be greater the shorter the life span of the species. This was expected for reasons discussed earlier.

The simulation models suggest that Alternative 2 harvests are lower than those under Alternative 1, and that Alternative 4 harvests are even lower. The reductions range from 0% for BSAI Pacific Ocean perch and sablefish to 10.5% for GOA pollock under Alternative 2, and from 0% for Pacific Ocean perch to 16% for GOA pollock under Alternative 4.

Although the tonnage reductions often appear modest compared to Alternative 1 tonnages, the dollar magnitudes may be significant. If these tonnage changes in Tables 5.10-4 and 5.10-5 were multiplied by first wholesale prices for 2000 [36] (the most recent year with the price information as of May 2002) the impact under Alternative 2 would be about $40 million dollars, while the total

[36] The first wholesale prices used to produce these revenue estimates were described in a footnote to the discussion of the retrospective model.

dollar impact under Alternative 4 would be about $80 million dollars.[37] [38] Given the limitations of the model, these amounts should be treated as indicators rather than predictions. The bulk of these reductions in value are coming from the pollock fisheries in the EBS and GOA. Small percentage changes in the EBS pollock catches can translate into large dollar values.

The reductions in ABCs under Alternatives 2 and 4 projected by the simulation model may understate the reductions we could expect. For example, although the simulation model suggests that average harvests will be lower under Alternatives 2 and 4, the model also suggests that, in the absence of any offsetting changes, the fishery will tend to inadvertently exceed the overfishing (OFL) level more often. While the OFL level might also be exceeded inadvertently under Alternative 1[39], it is likely to be exceeded more often under Alternatives 2 and 4. This may seem like a contradictory result: the average harvests are lower, but the OFL is exceeded in more years. This, however, is a result of increased variance in harvests under Alternatives 2 and 4. While the mean is lower, the variation around the mean is larger, and the OFL tends to be exceeded more often. The implication of this, however, is that the Council will behave more conservatively than would be implied by the straight biological model of specification determination, and will set TACs lower than they otherwise would have. Thus actual harvests might be lower than implied in Tables 5.10-4 and 5.10-5.

However, there may also be factors that lead the model to overstate the negative impacts. This model does not focus on the Council deliberations through which the ABCs and TACs are set. As noted in Section 5.8, under Alternatives 2 and 4 NMFS and the Council would have an opportunity in the fall of the year prior to the specifications year to examine new survey data. If these data showed low harvest levels for some species, NMFS could address the problem by regulatory action. These actions may be more likely in cases where very low stock levels would raise concerns about stock conservation. If this sort of action tends to offset the impact of the lag that would otherwise be introduced by Alternatives 2 and 4, the year-to-year biomass fluctuation would be less than currently projected in the simulations. This would reduce the number of years in which low biomass levels triggered low harvest rates through the sliding scale and may tend to increase average ABCs from what the simulation model might have predicted.

The lower ABCs and associated harvests also have an implication for the mean size of the spawning biomass: since fewer fish are being harvested, mean annual spawning biomass sizes are larger. Table 5.10-6 shows the model estimates of mean spawning biomass under Alternatives 1, 2 and 4.

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[37]The retrospective model suggested different results for Alternative 2 (the retrospective model was not run for Alternative 4). In the retrospective model BSAI Pacific cod and GOA pollock tonnages actually increased by relatively large amounts compared to the Alternative 1 levels. The net revenue impact obtained by multiplying the tonnage changes by the 2000 first wholesale prices could be in the tens of millions of dollars (including possible increases) for individual species, but for the four species examined, taken together, it was very small.

[38]Although, as noted, price changes might be expected to mute some of the fluctuations in gross revenues, the information needed to estimate the changes in price is not available. Therefore, these revenue changes do not incorporate price impacts.

[39]One shortcoming of the simulation model is that it cannot identify the instances when the OFL would be exceeded under Alternative 1.

Table 5.10-6 Mean spawning biomass under Alternatives 1, 2 and 4

Species	Alternative 1	Alternative 2	Alternative 4
EBS pollock	2,643	2,717	2,784
BSAI Pacific cod	442	454	469
AI Atka mackerel	128	146	153
BSAI Pacific ocean perch	142	142	142
GOA pollock	251	289	311
Sablefish	225	231	238
Notes: These estimates are summarized from Table 4.1-2 of this EA/RIR/IRFA			

The simulation results also suggest that Alternatives 2 and 4 (and to some extent Alternative 3) may result in somewhat more year-to-year variation in ABCs, as well as lower average ABCs. The changes in the year-to-year variation are illustrated by simulation "coefficients of variation" in Table 5.10-7. The coefficient of variation is a statistical measure of relative variation. It is equal to the ratio of the standard deviation of simulation results to the mean of the simulation results. The standard deviation is itself a measure of variability. The coefficient of variation is used here because it provides a measure of the relative variability. In general, the increases appear to be modest. The year-to-year variation in ABC even appears to decline for AI Atka mackerel. This decline in variability appears to be related to the fact that the age-selectivity for the oldest Atka mackerel is quite low.

Table 5.10-7 Coefficient of variation calculated for the harvests under Alternatives 2 and 4

Species	Alternative 1	Alternative 2	
EBS pollock	32.8	38.4	39.0
BSAI Pacific cod	24.6	26.8	25.8
AI Atka mackerel	41.3	35.4	28.8
BSAI Pacific ocean perch	11.2	11.2	11.4
GOA pollock	54.8	61.1	56.8
Sablefish	36.5	39.1	39.2
Notes: These estimates are summarized from Table 4.1-2 of this EA/RIR/IRFA			

In summary, there appear to be four impacts on harvest and biomass levels: (1) biomass levels are more variable; (2) ABCs and harvest levels are smaller; (3) ABCs and harvests are more variable; and (4) biomass levels are higher.

These impacts appear likely to have several classes of economic impacts: (1) reduced fishery revenues and profits; (2) increased costs and reduced profits flowing from increased year-to-year harvest fluctuations; (3) impacts on valued elements of the ecosystem.

Revenue impacts have already been discussed. Potential revenue impacts suggested by the model results are summarized in Section 5.10. As noted, the revenue impacts are ambiguous. The retrospective model suggests there may be significant positive and negative impacts by species. The net impact for the four species examined were almost zero, but this could change with the introduction of more species. The simulation model suggests that ABC setting based on the models used by assessment authors might push the process towards lower ABCs and harvests. However, the simulation modeling approach only looked at a part of the overall specifications process and the results were associated with great uncertainty.

Changes in the variability of year-to-year harvests may have social costs. These do not have to do with short-run projections of TACs and planning by organizations. As noted earlier, these planning horizons should be lengthened under Alternatives 2, 3 and 4, since the longer decision making process should provide reliable information about each year's TACs somewhat earlier. However, the TACs about which stakeholders would have earlier knowledge would (except for Atka mackerel) be changing by somewhat larger amounts from year-to-year.

Increased year-to year variability of harvests can contribute to market instability and increase the importance of inventories, perhaps increasing the average size of the inventories that are held. Increased inventories would be associated with increased storage and interest expenses for the firms holding them. Increased year-to-year fluctuations in harvests may increase the risk associated with fishing businesses and increase the interest rates they must pay for capital. Increased year-to-year fluctuations in income may impose a burden on persons trying to maintain a consistent standard of living from one year to another. Increased year-to-year variability in harvests may also impact the public sector by increasing the year-to-year fluctuations in raw fish tax revenues earned by the State of Alaska and by shoreside fishing communities.

The changes in the fish stock biomass may also have impacts on ecosystem services that persons value. Biomass is expected to be higher, but more variable. The net implications of these changes for an ecosystem component such as Steller sea lions are unknown. However, persons place a value on the survival of the sea lions, whose western distinct population segment is endangered. Biomass changes that enhanced the survival prospects for the sea lions would create a benefit, while changes that reduced those prospects would create a cost.

5.11 Options to Alternatives

Alternative 2 has one option: for those GOA and BSAI target species on a biennial survey schedule, set TAC biennially. The species on a biennial survey schedule include all of the target species in the

Aleutian Islands, Bering Sea sablefish, and all GOA target species, except for sablefish. Currently, the resource surveys in these areas are done every two years. ABCs are recommended based on the most recent survey data which may have been collected one or two years in the past. The specifications process for Alternative 2 would be the same under this option, except that the stock assessment and rulemaking process for the biennially surveyed species would be completed every other year with ABC recommendations and harvest specifications established for two years. As noted in Section 4.1.4 of this EA/RIR/IRFA, under these circumstances, Option 2 is very similar (for these species) to Alternative 4.

Alternative 3 has two options : 1) set sablefish TAC on a January through December schedule and 2) Reschedule the December Council meeting to January. The purpose of Option 1 is to maintain the management of the sablefish IFQ program on the same annual schedule as the halibut IFQ program. Stock assessment information would be used to project the TAC to the following calendar year. For instance, 2000 stock assessment information would be used to establish TAC for all species, except sablefish, for July 2001 through June 2002. Sablefish TAC would be established with 2000 stock assessment information for January 2002 through December 2002.

Option 2 to Alternative 3 which moves the Council's decision making process from December to January, has the advantage of providing assessment authors and plan teams with more time to prepare their ABC and OFL recommendations for the Council. Science Center staff have indicated that this additional time may be helpful, particularly in instances when new survey data have unexpected information, and staff scientists need additional time to assimilate it into their models and projections. This option would require considerable adjustment on the part of the Council community, and would also seriously reduce the time available to move from the Council's specifications recommendations to a final rule.

Alternative 4 has two options: (1) set PSC limits annually, and (2) set PSC limits every two years based on regulations and for crab and herring use either projected values or rollovers from the previous year. Under Option 1, the PSC apportionments would need to be recommended annually by the Council, and NMFS would implement the PSC limits with proposed and final rulemaking under the same schedule used under Alternative 2. As discussed in Section 4.2 of this EA/RIR/IRFA, under Alternative 2 there is potential for improved PSC management due to the end of the 25 percent of the annual PSC limits restriction during the period the interim specifications are in effect. Overall annual PSC limits are not likely to be affected by this option. Option 2 would put the PSC limit specifications on the same two year schedule as the other harvest specifications. As discussed in Section 4.2, Option 2 may be considered if the State of Alaska and NMFS have the resources, and if the biomass assessments are reliable enough to project crab and herring PSC limits. Currently resources are only available for annual biomass estimates for these species. Unless additional resources can be made available, NMFS recommends that Option 2 be withdrawn from further consideration.

There are two options that may be used with any of the four alternatives. Option A would abolish non-specified TAC reserves and Option B would update the language in portions of the FMPs. As discussed in Sections 1.4.1, 1.4.2, and 4.1.4 of this EA/RIR/IRFA, the reserves system was designed to meet management needs for flexibility when fishing and processing were performed by foreign

fleets or under joint ventures. While conceptually, the unspecified reserves can allow managers to adjust the harvests of different species somewhat, this option has only been used once since 1991. The flexibility provided by the unspecified reserves can be achieved in other ways, while the system itself can increase confusion regarding which numbers are currently available for harvest and increase the administrative burden on fisheries managers. The elimination of the unspecified reserves is assumed to provide modest benefits at no cost. The effect of Option B is described in detail in Section 1.5 of this EA/RIR/IRFA. Option B would update FMP language to more accurately describe the current responsibilities of the Council plan teams and to eliminate references to foreign fishing (which no longer takes place). This option also is expected to provide modest benefits at no cost.

5.12 Summary of benefit-cost analysis

The purpose of a benefit cost analysis is to summarize the tradeoffs between different alternatives in a systematic way.[40] Summarization of the information in estimated monetary net benefits for each alternative is very helpful when it can be done, but has been impossible in this instance. In order to facilitate the comparison of the tradeoffs among the alternatives, in the absence of monetary net benefit estimates, the qualitative, quantitative, and monetary costs and benefits that it has been possible to identify are summarized below in Table 5.11.[41]

[40]This is an important difference between a cost-benefit analysis required under E.O. 12866, and a NEPA EA assessment. A NEPA EA or EIS assessment compares each alternative to a defined level of environmental significance; it is not meant to provide a summary or valuation of the tradeoffs between alternatives.

[41]These impacts are discussed more carefully in Sections 5.8 (" Impacts on the harvest specification process"), 5.9 (" Changes in fishing year under Alternative 3"), and 5.10 (" Changes in harvests and biomass under Alternatives 2, 3, and 4"). The final section of the RIR, Section 4.12, summarizes the implications for the E.O. 12866 significance analysis. These proposals are not believed to be significant within the meaning of E.O. 12866.

Table 5.12 Summary of costs and benefits of the alternatives

	Alt 1	Alt 2		Alt 3				
	No action, baseline. Specifications based on previous years surveys	*Specifications based on surveys two years before*	Option *Specifications based on surveys two years before. Biennial TAC for species on biennial survey schedule.*	*Start the fishing year on July1*	Option 1 *Sablefish on 1/1-12/31 year*	Option 2 *Dec. Council Meeting moved to Jan.*	Option 1 *Determine specifications for two years at a time. Annual PSC limits.*	
	Opportunity for analysis and peer review of survey data. Notice and comment not based on specifications that will eventually be adopted. Little time for Secretarial review. Potential for public confusion given tenuous relationship between proposed and final specifications. Not administratively efficient.	Improved opportunity for analysis of survey results and peer review before use. Use of increasingly lagged survey results. Ppotential to address new information through additional rulemaking. Provides significantly enhanced opportunities for notice and comment and Secretarial review. Promotes administrative efficiency.	Improved opportunity for analysis of survey results and peer review before use. Use of increasingly lagged survey results. Potential to address new information through additional rulemaking. Provides significantly enhanced opportunities for notice and comment and Secretarial review. Promotes administrative efficiency.	No improvement in the quality of scientific information over Alt. 1, unless Option 2 is adopted. Does provide improved opportunities for public notice and comment and Secretarial review. Without Option 1, the change in the fishing year has the potential to disrupt the sablefish fishery fisheries. The change may create temporary public confusion. The adjustments to deal with sablefish issues would not contribute to administrative efficiency, unless the Option 1 is adopted.			Improved opportunity for analysis of survey results and peer review before use. Use of increasingly lagged survey results. Potential to address new information through additional rulemaking. Provides significantly enhanced opportunities for notice and comment and Secretarial review. Promotes administrative efficiency.	Improved opportunity for analysis of survey results and peer review before use. Use of increasingly lagged survey results. Potential to address new information through additional rulemaking. Provides significantly enhanced opportunities for notice and comment and Secretarial review. Promotes administrative efficiency.

	Alt 1	Alt 2		Alt 3				
	No action, baseline. Specifications based on previous years surveys	*Specifications based on surveys two years before*	Option *Specifications based on surveys two years before. Biennial TAC for species on biennial survey schedule.*	*Start the fishing year on July1*	Option 1 *Sablefish on 1/1-12/31 year*	Option 2 *Dec. Council Meeting moved to Jan.*	Option 1 *Determine specifications for two years at a time. Annual PSC limits.*	
Opportunities for analysis and scientific peer review (from Section 5.8)	Baseline and status quo (currently about two months available)	More time (three to four months)	More time (three to four months)	Little change from baseline (about two months) Option 2 provides an additional month for analysis and review.			More time (three to four months)	More time (three to four months) May require additional resources (over those required for Option 1) to make crab and herring biomass projections two years in advance. Unless these reources are forthcoming NMFS recommends that this alternative be withdrawn from further consideration.
Opportunities for notice and comment (from Section 5.8)	Baseline and status quo	Better information on which to comment. More time for the process.	Better information on which to comment. More time for the process.	Better information on which to comment. More time for the process.(But **not to the same extent as Alternatives 2 and 4**) Less time under Option 2.			Better information on which to comment. More time for the process.	Better information on which to comment. More time for the process.
	Baseline and status quo	Better information on which to make decisions - more time for the process.	Better information on which to make decisions - more time for the process.	Better information on which to make decisions - more time for the process. (But **less than under Alternatives 2 and 4**) Less time to consider comments under Option 2.			Better information on which to make decisions - more time for the process.	Better information on which to make decisions - more time for the process.

	Alt 1	Alt 2		Alt 3				
	No action, baseline. Specifications based on previous years surveys	*Specifications based on surveys two years before*	Option *Specifications based on surveys two years before. Biennial TAC for species on biennial survey schedule.*	*Start the fishing year on July1*	Option 1 *Sablefish on 1/1-12/31 year*	Option 2 *Dec. Council Meeting moved to Jan.*	Option 1 *Determine specifications for two years at a time. Annual PSC limits.*	
	Baseline and status quo	Additional analysis time, notice and comment, and decision making time may increase administrative costs and time invested by public.	Additional analysis time, notice and comment, and decision making time may increase administrative costs and time invested by public. Biennial specifications for biennially surveyed species may reduce costs of specifications process over Alt2 without the option.	Additional analysis time, notice and comment, and decision making time may increase administrative costs and time invested by public.			Additional analysis time, notice and comment, and decision making time may increase administrative costs and time invested by public. Biennial specifications may reduce administrative costs.	Additional analysis time, notice and comment, and decision making time may increase administrative costs and time invested by public. Biennial specifications may reduce administrative costs. However, additional resources may not be available for two year crab and herring biomass projections.

	Alt 1	Alt 2		Alt 3			Alt 4	
	No action, baseline. Specifications based on previous years surveys	*Specifications based on surveys two years before*	Option *Specifications based on surveys two years before. Biennial TAC for species on biennial survey schedule.*	*Start the fishing year on July1*	Option 1 *Sablefish on 1/1-12/31 year*	Option 2 Dec. Council Meeting moved to Jan.	Option *Determine specifications for two years at a time. Annual PSC limits.*	Option 2 *Determine specifications for two years at a time. Set PSC limits every two years.*
Private sector planning horizons (from Section 5.8)	Status quo and baseline (less than one month)	About nine months	About nine months	Six or seven months			About nine months for first year, almost 21 for second year	About nine months for first year, almost 21 for second year

	Alt 1	Alt 2		Alt 3				
	No action, baseline. Specifications based on previous years surveys	*Specifications based on surveys two years before*	Option *Specifications based on surveys two years before. Biennial TAC for species on biennial survey schedule.*	*Start the fishing year on July1*	Option 1 *Sablefish on 1/1-12/31 year*	Option 2 Dec. Council Meeting moved to Jan.	Option *Determine specifications for two years at a time. Annual PSC limits.*	
Fishing year induced changes in fishing behavior (from Section 5.9)	Baseline and status quo	None	None	Potential costs, many of which could be addressed by changes in fishing seasons, changes in distribution of PSC limits, and other measures. Limited opportunities for rollovers. Serious problems may occur for sablefish and related halibut fishing, if Option 1 not adopted.			None	None
Impact on projected harvests (from Section 5.10)	Baseline and status quo	Possibility of reduction in mean harvests and increased variability in harvests.	Possibility of reduction in mean harvests and increased variability in harvests.	Possibility of reduction in mean harvests and increased variability in harvests. These impacts would be **smaller than those for Alternative 2.**			Possibility of reduction in mean harvests and increased variability in harvests. These impacts would be **greater than those for Alternative 2.**	Possibility of reduction in mean harvests and increased variability in harvests. These impacts would be **greater than those for Alternative 2**.
	Baseline and status quo	Possibility of increased mean spawning biomass with increased variability in spawning biomass	Possibility of increased mean spawning biomass with increased variability in spawning biomass	Possibility of increased mean spawning biomass with increased variability in spawning biomass. These impacts would be **smaller than those for Alternative 2**.			Possibility of increased mean spawning biomass with increased variability in spawning biomass. These impacts would be **greater than those for Alternative 2**.	Possibility of increased mean spawning biomass with increased variability in spawning biomass. These impacts would be **greater than those for Alternative 2**.

	Alt 1	Alt 2		Alt 3				
	No action, baseline. Specifications based on previous years surveys	*Specifications based on surveys two years before*	Option *Specifications based on surveys two years before. Biennial TAC for species on biennial survey schedule.*	*Start the fishing year on July1*	Option 1 *Sablefish on 1/1-12/31 year*	Option 2 Dec. Council Meeting moved to Jan.	Option *Determine specifications for two years at a time. Annual PSC limits.*	
Net benefits	Baseline and status quo Not possible to monetize net benefits. This alternative does not appear to meet the objectives of the proposed action.	Not possible to monetize net benefits This alternative (along with Alt. 4) may come closest to meeting the objectives of the proposed action. However, it may be costly because of less harvest.	Not possible to monetize net benefits This alternative (along with Alt. 4) may come closest to meeting the objectives of the proposed action. However, it may be costly because of less harvest.	Not possible to monetize net benefits This alternative improves notice and comment. Should be less costly than Alternative 2 in terms of potentially lower ABCs and harvests. Requires more systematic revision of fishing season due to new fishing year. This may create serious problems for the sablefish IFQ fishery, if the option is not adopted			Not possible to monetize net benefits. This alternative (along with Alt. 2) may come closest to meeting the objectives of the proposed action. However, it may be costly because of less harvest.	Not possible to monetize net benefits This alternative (along with Alt. 2) may come closest to meeting the objectives of the proposed action. However, it may be costly because of less harvest.
	Baseline and status quo	Does not appear to be significant with respect to considerations in this RIR. Impact appears to be less than $100 million.	Does not appear to be significant with respect to considerations in this RIR. Impact appears to be less than $100 million.	Does not appear to be significant with respect to considerations in this RIR. Impact appears to be less than $100 million.			Does not appear to be significant with respect to considerations in this RIR. Impact appears to be less than $100 million.	Does not appear to be significant with respect to considerations in this RIR. Impact appears to be less than $100 million.

5.13 Summary of E.O. 12866 significance criteria

A "significant regulatory action" under E.O. 12866 means any action that is likely to result in a rule that may:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the executive order.

NMFS does not expect that any of the proposals will have an annual effect on the economy of $100 million or more, or will adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local or tribal governments. As described in Section 5.6 of this EA/RIR/IRFA, the aggregate value of groundfish production from groundfish fisheries in the GOA and the BSAI at the first wholesale level[42] was about one billion dollars in 2000 (Hiatt, *et al.*, 2001, Tables 24 and 25, pages 54 and 56).

An alternative would have to have to increase or decrease the first wholesale value of the product by 10% per year in order to trigger the first significance criterion. However, as noted in Table 5.10-5, the average percentage reductions suggested by the simulation model under Alternative 4, perhaps the most systematically one-sided and costly results generated by the analysis, only two species had negative impacts over 10%. The important EBS pollock, BSAI Pacific cod, and sablefish species had negative impacts of harvest between 3% and 5%. To some extent these reductions in production would be offset by price increases.

Moreover, as noted in the discussion of the impacts of the alternatives, the changes contemplated are primarily procedural, and are expected to have no direct impact on the total volume, timing, or species composition of fish harvested and processed. Any impact on the value of the product, such as that just discussed, would occur as a result of new Federal decisions and actions taken under the new specifications process to specify annual or biennial ABCs, OFLs, and TACs. These actions may lead to changes in ABCs, OFLs and TACs because the increased time frames for analysis, public notice and comment, and decision making lead to better decisions about optimal harvest rates. These actions could only be taken following new NEPA, E.O. 12866, and RFA analyses.

NMFS has not identified any factors that would "Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency." The actions proposed may reduce the

[42]The first wholesale level means the first sale of processed product by onshore processors, catcher/processor vessels, or motherships.

likelihood that future specifications decisions would interfere with actions taken or planned by another agency because the longer time period available for analysis, notice and comment, and decision making, provides more opportunities for input from the public and other agencies in any given rulemaking.

NMFS has not identified any factors that would: (a) "Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof"; or (b) "Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the executive order."

In summary, it does not appear to meet these criteria for a "significant regulatory action".